

BID NO. PUR-1355

CONTRACT FORMS, BID FORMS AND SPECIFICATIONS

**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM
AND CARRIER VEHICLE**

AIP-3-24-0019-xxx-2017

MAA-GR-xxx-17

PREPARED FOR THE

**HAGERSTOWN REGIONAL AIRPORT –
RICHARD A. HENSON FIELD**

HAGERSTOWN, MARYLAND



BID DOCUMENTS

July 2017

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PUR 1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
 ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM
 AND CARRIER VEHICLE**

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Airport Rotary Plow & Runway Broom With Carrier Vehicle**

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**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM
AND CARRIER VEHICLE**

INTRODUCTION

GENERAL PROJECT SUMMARY

1. GENERAL

- 1.01 Project Identification: This project shall be known as "**(PUR-1355) Snow Removal Equipment – One(1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Airblast System and Carrier Vehicle**" The Federal Aviation Administration (FAA) is contributing to the project through the Airport Improvement Program. The FAA identification for this project is AIP-3-24-0019-xxx-2017.
- 1.02 Bid Documents: Bid documents are available immediately from the Washington County Website: <http://www2.washco-md.net/purchasing/invitations.shtm> by accessing the “Office of Budget & Finance Purchasing Department Current Invitations” or may be obtained from:

Washington County Purchasing Department
100 West Washington Street, Room 3200
Hagerstown, Maryland 21740

2. GENERAL DESCRIPTION OF WORK

- 2.01 General. All equipment supplied under this contract shall be done in accordance with the specifications and references contained within the Contract Documents. The work shall include all materials, equipment, labor, tools and other incidentals necessary to complete the procurement.
- 2.02 This project includes procurement of the following snow removal equipment for Hagerstown Regional Airport - Richard A. Henson Field:

One (1) Multi-Purpose Airport Rotary Plow, Airport Runway Broom with Airblast System and Carrier Vehicle.



**PURCHASING DEPARTMENT
DIVISION OF BUDGET & FINANCE**

100 West Washington Street, Room 3200 | Hagerstown, MD 21740-4748 | P: 240.313.2330 | F: 240.313.2331
www.washco-md.net

**PUR-1355
INVITATION TO BID**

**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY
PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYTEM AND CARRIER
VEHICLE**

The Board of County Commissioners of Washington County, Hagerstown, Maryland (hereinafter the “Owner”) will receive sealed bids for the project titled “**(PUR-1355) Snow Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Airblast System and Carrier Vehicle**” at the Hagerstown Regional Airport - Richard A. Henson Field, Washington County, Maryland. Bids must be received and time stamped at the Washington County Purchasing Department, Washington County Administration Complex, 100 West Washington Street, Room 3200, Third Floor, Hagerstown, Maryland, 21740-4748, no later than **2:00 p.m., (ESDT) Wednesday, August 9, 2017** at which time they will be publicly **opened and read aloud in the Washington County Administration Complex, Second Floor Conference Room 2001**. Bids received after this time will be returned unopened. Bid documents are available immediately from the Washington County Website: <http://www2.washco-md.net/purchasing/invitations.shtm> by accessing the “Office of Budget & Finance Purchasing Department Current Invitations” or may be obtained from:

Washington County Purchasing Department
100 W. Washington Street, Room 3200
Hagerstown, Maryland 21740

Bidders shall make a good faith effort to obtain Disadvantaged Business Enterprise (DBE) participation of one (1%) percent of the dollar value of the Contract in accordance with the Federal Aviation Administration (FAA) DBE Program, 49 CFR 26, and the goals established by the Airport.

Bid Security in the form of a Cashier’s Check, Certified Check, or Bid Bond payable to the Board of County Commissioners, Washington County, in an amount equal to **five percent (5%)** of the Bid Price shall be submitted by each bidding Contractor. The successful bidder is required to furnish satisfactory Payment and Performance Bonds for the full amount of the Contract. Bids shall be properly and completely executed on bid forms (FORM OF PROPOSAL) provided with the bid documents in accordance with the “Instructions to Bidders.” All work shall conform to the specifications. The contractor shall use the Schedule of Prices forms from the Bid Documents to submit his/her bid.

A Pre-Bid Conference will be held on **Wednesday, July 19, 2017 at 11:00 A.M., (ESDT)** at the Washington County Administration Complex, 100 West Washington County Administration Building, Second Floor Conference Room 2001, Hagerstown, Maryland. Attendance at this Conference will not be mandatory for those bidders wishing to submit bids, but it is strongly encouraged.

Invitation to Bid

PUR-1355

**Snow Removal Equipment – One (1) Multi-Purpose
Airport Rotary Plow & Runway Broom With Carrier Vehicle**

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The Owner may make such investigations as deemed necessary to determine the ability of the bidder to successfully complete the procurement, and prospective bidders shall be required to furnish to the Owner's representative evidence of performance of similar projects of this magnitude and complication and all such information and data for this purpose as may be requested. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligation of the Contract and to complete the work contemplated therein.

NOTE: All Proposers must enter the Washington County Administration Complex through either the front door at the 100 West Washington Street entrance or through the rear entrance (w/blue canopy roof) which is handicap accessible, and must use the elevator to access the Purchasing Department to submit their proposal and/or to attend the Pre-Proposal Conference. Alternate routes are controlled by a door access system. Washington County Government has announced new security protocols being implemented at the Washington County Administration Complex at 100 West Washington Street, Hagerstown. The new measures took effect Tuesday, February 14, 2017. The general public will be subject to wand search and will be required to remove any unauthorized items from the building prior to entry. Prohibited items include, but are not limited to: Weapons of any type; Firearms, ammunition and explosive devices; Cutting instruments of any type- including knives, scissors, box cutters, work tools, knitting needles, or anything with a cutting edge, etc.; Pepper spray, mace or any other chemical defense sprays; and Illegal substances.

Washington County makes positive efforts to utilize Disadvantaged Business Enterprises for its supplies and services and allows these sources the maximum feasible opportunity to compete for contracts. The Board of County Commissioners does not discriminate on the basis of race, color, national origin, sex, religion, age, and disability in employment or the provision of services. Individuals requiring special accommodations are requested to contact the undersigned at 240-313-2330 Voice, TTY Dial 711 to make arrangements no later than seven (7) calendar days prior to the Pre-Bid Conference and/or Bid Opening.

The Board of County Commissioners of Washington County, Maryland, reserves the right to accept or reject any or all bids and to waive formalities, informalities and technicalities therein. The Board reserves the right to contact a Bidder for clarifications and may, at its sole discretion, allow a Bidder to correct any and all formalities, informalities and technicalities in the best interest of Washington County.

Funding for the procurement of the vehicles through the Federal Aviation Administration (FAA) Airport Improvement Program (AIP) is anticipated. FAA required contract provisions include, but are not limited to: Buy American Preference, Foreign Trade Restriction and Debarment and Suspension.

BY THE AUTHORITY OF:



Karen R. Luther, CPPO
Purchasing Director

PUR-1355

SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM AND CARRIER VEHICLE

INSTRUCTIONS TO BIDDERS

To be considered, Proposals must be made in accordance with these Instructions to Bidders.

1. **SEALED PROPOSALS:** Sealed proposals must be received and time-stamped at the Washington County Purchasing Department at the County Administration Complex, 100 West Washington Street, Room 3200, Hagerstown, Maryland 21740, **no later than 2:00 P.M., (ESDT) Wednesday, August 9, 2017 at which time they will be publicly opened and read aloud in the Second Floor Conference Room 2001.** Bids received after this time will be returned unopened.
2. **PRESENTATION OF BIDS:** These specifications include a set of Proposal Forms that the Contractor shall fill out. Each proposal shall be submitted on the forms as set forth in these specifications, accompanied by a CERTIFIED CHECK, CASHIER'S CHECK or BID BOND made payable to the Board of County Commissioners of Washington County.

These documents shall be placed in an opaque envelope sealed and endorsed with the project name, AIP No., bidder's company name and address, name and address of the Owner receiving proposal, and bidder's Maryland registration number. The outside of the envelope shall indicate: **"BID PROPOSAL – (PUR-1355) SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM AND CARRIER VEHICLE."** The enclosed documents shall be completed in their entirety. (All blank spaces on the documents must be completed, in ink or typewritten.) The completed documents shall be without interlineation, alteration, or erasures. The signature of the bidder shall be longhand. No responsibility shall be attached to any person or persons for premature opening of bids not properly endorsed or sealed. Each bidder shall be entirely responsible for having the proposal in the hands of the Owner at the time and place as specified above. Otherwise, the bid **will not** be accepted and the Owner shall in no way be responsible for its loss or destruction. Ample time should be allowed for the transmittal of bids by mail, and postmarks indicating the date of mailing will not be considered as evidence of intent to submit bids in proper time for the opening. The Owner reserves the right to reject any or all bids and to waive defects or informalities in any bid, if it is deemed to be in the best interest of Washington County.

3. **DOCUMENTS:** Bid documents are available immediately from the Washington County Website: <http://www2.washco-md.net/purchasing/invitations.shtm> by accessing the "Budget & Finance Purchasing Department Current Invitations" or may be obtained from:

Washington County Purchasing Department
Washington County Administration Complex
100 West Washington Street, Room 3200
Hagerstown, Maryland 21740

4. **WITHDRAWAL OF BIDS:** A bid may be withdrawn by written or telegraphic request subsequently confirmed in writing provided that such request is received prior to the time of opening bids as stated above. However, the Owner will not be held responsible for the timely receipt of any request for ample time for delivery before the bid opening. No bid received can be withdrawn by any bidder for a period of ninety (90) calendar days after this opening, as no claim for release on account of mistake or omission in the bidding will be considered. Each bidder will be held strictly responsible to his bid.
5. **INTERPRETATION, DISCREPANCIES, OMISSIONS:** Should any bidder find discrepancies in, or omissions from, the bid documents, or should be in doubt of their meaning, the bidder should at once request in writing an interpretation from:

Rick Curry, CPPO, County Buyer
Washington County Purchasing Department
Washington County Administration Complex
100 West Washington Street, Room 3200
Hagerstown, Maryland 21740
FAX: 240-313-2331; or send questions in Microsoft Word
platform via-email to: purchasingquestions@washco-md.net

All necessary interpretations will be issued to all bidders in the form of addenda to the specifications, and such addenda shall become part of the contract documents. No requests received after **4:00 P.M., (ESDT) Thursday, July 27, 2017** will be considered. Every interpretation made by the County will be made in the form of an addendum which, if issued, will be sent by the Purchasing Director to all bid document holders.

6. **BID SECURITY:** Bid Security in the form of a Cashier's Check, Certified Check, or Bid Bond payable to the Board of County Commissioners, Washington County, in an amount equal to five percent (5%) of the Bid Price shall be submitted by each bidding Contractor. The Cashier's Check or Certified Check must be drawn on a solvent bank authorized to do business in the State of Maryland. The surety company issuing the Bid Bond must be authorized to do business in the State of Maryland. The successful bidder's security will be retained until he/she has signed the Contract and furnished the required payment and performance bonds. The Owner reserves the right to retain the security of the two lowest bidders until the low bidder enters into a Contract or until ninety (90) consecutive calendar days from the bid opening, whichever is sooner. The Owner will retain this Bid Security as liquidated damages, but not as a penalty, should the low bidder fail to enter into a contract or provide bonds as stipulated. Should the low bidder enter into a contract as stipulated, the bid security of the second bidder shall be returned forthwith, otherwise upon failure of the low bidder to enter into a contract, action may begin with the second bidder under the same provisions as for the low bidder, or all bids will be rejected.
7. **SECURITY FOR FAITHFUL PERFORMANCE AND PAYMENT:** Simultaneously with his delivery of the executed contract, the Contractor shall furnish a Surety Bond or Bonds for the full value of the contract as security for faithful performance of this project under this Contract and faithful payment for labor and materials in connection with this Contract, as specified elsewhere in the contract forms contained herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

8. **POWER OF ATTORNEY:** Attorney's-in-fact who sign Bid Bonds or Contract Bonds must file with each bond a certified and effectively dated copy of their power of attorney.
9. **LAWS AND REGULATIONS:** The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over delivery of equipment shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.
10. **EXAMINATION OF DOCUMENTS:** The act of submitting a bid is considered to be acknowledgment by the bidder that he/she has had an opportunity to inspect the Contract documents and is familiar with the conditions and requirements and shall submit his/her bid accordingly. All proposals must be filled in, in ink or typewritten. All bids must contain all required signatures and seals.

No plea of ignorance will be accepted of reasonably discoverable conditions that exist, or of conditions or difficulties that may be encountered in the execution of work, as a result of failure of bidder to make such examination and investigation or failure to notify the County.

11. **QUALIFICATIONS:** The Owner may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidders shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligation of the Contract and to complete the work contemplated therein. Conditional bids will not be accepted.
12. **SUBSTITUTIONS:** All equipment is to be supplied in exact accordance with the specifications. Substitution requests will not be considered.
13. **PRE-BID CONFERENCE:** As described in the Invitation to Bid, a Pre-Bid Conference will be held on **Wednesday, July 19, 2017 at 11:00 A.M., (ESDT)** at the Washington County Administration Complex, 100 West Washington Street, Second Floor, Room 2001, Hagerstown, Maryland with all interested parties. This will be an informal question and answer type meeting. Attendance at this conference will not be mandatory but it is strongly encouraged for those Contractors wishing to submit bids.
14. **OPENING:** Proposals will be opened as announced in the Invitation to Bid.
15. **TIME OF COMPLETION:** By submission of proposal, the Bidder agrees to commence work under this contract upon receipt of the Notice to Proceed, prosecute the work diligently and substantially complete the project within three hundred sixty (360) consecutive calendar days.
16. **WARRANTY:** Warranty for the equipment shall be as listed in the technical specifications.
17. **NOTICE OF POLITICAL CONTRIBUTIONS:** The Bidder agrees, in accordance with Maryland Code, State Finance and Procurement Article, Paragraph 17-402, to comply with the political contribution reporting requirements under Maryland Code, Article 33, Title 14, as amended from time to time, to which the Bidder may be subject and requires that every person that enters into contracts, leases, or other agreements with the State, a county, or any incorporated municipality, or their agencies during a calendar year in which the person receives

in the aggregate \$100,000 or more, shall file with the State Administrative Board of Election Laws a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election. The statement shall be filed with the State Administrative Board of Election Laws: (1) before a purchase or execution of a lease or contract by the State, a county, an incorporated municipality or their agencies, and shall cover the preceding two (2) calendar years; and (2) if the contribution is made after the execution of a lease or contract, then twice a year, throughout the contract term, on: (a) February 5, to cover the 6-month period ending January 31; and (b) August 5, to cover the 6-month period ending July 31.

18. **PAYMENT OF COUNTY AND MUNICIPAL TAXES:** Effective October 1, 1993, in compliance with Section 1-106(b)(3) of the Code of the Public Local Laws of Washington County, Maryland, “If a bidder has not paid all taxes owed to the County or a municipal corporation in the County, the County Commissioners may reject the bidder's bid.”

19. **REGISTRATION WITH MARYLAND DEPARTMENT OF ASSESSMENT AND TAXATION:** Prior to contracting, private corporations must either be incorporated in the State of Maryland or registered with the Maryland Department of Assessments and Taxation as a foreign corporation, and must be in good standing. Proof of such standing is required prior to the start of the contracting process and shall remain so throughout the term of this contract. The website for the State Department of Assessments and Taxation is <http://dat.maryland.gov/businesses/Pages/default.aspx> the phone numbers for the State Department of Assessments and taxation are: (410) 767-1340 or (888) 246-5941.

PUR-1355

**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY
PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM AND CARRIER
VEHICLE**

PROJECT BID FORMS

The following bid forms (Bid Bond, Labor and Material Payment Bond, Performance Bond, Bidder's Affidavit, Form of Non-Collusion Affidavit, Bidder's DBE Certification and Certificate of Buy American Compliance for Manufactured Products (For AIP Contract Projects) contained herein are for the use of the bidder and shall be:

- detached from the specification
- filled out, or
- executed.

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SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM AND CARRIER VEHICLE

FORM OF PROPOSAL

[Submit **Form of Proposal & Schedule of Prices** on loose forms supplied by the County]

Date: _____

Proposal of _____
(hereinafter called “Bidder”), *a corporation, organized and existing under the laws of the State
of _____, a partnership, or an individual doing business as

TO: Board of County Commissioners of Washington County, Maryland
C/o Washington County Purchasing Department
Washington County Administration Complex
100 West Washington Street, Room 3200
Hagerstown, Maryland 21740

Ladies/Gentlemen:

The bidder, in compliance with your invitation for bids for the project entitled “(PUR-1355) **Snow Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Airblast System and Carrier Vehicle**” at the Hagerstown Regional Airport - Richard A. Henson Field, Washington County, MD, has examined the specifications, and being familiar with all of the conditions associated with the equipment procurement including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, and other necessities, and to procure the equipment in accordance with the Contract Documents within the time set forth therein, and at the prices stated herein. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

COMPLETION TIME:

To begin the project at the time stated in the Notice to Proceed and to complete the work in accordance with the provisions of the Contract Documents.

Sign for Identification

Bidder acknowledges receipt of the following Addenda:

No.____ Date_____; No.____ Date_____; No.____ Date_____;
No.____ Date_____; No.____ Date_____; No.____ Date____;

A. BID TOTAL:

To furnish labor, materials, equipment, and services necessary to properly procure the equipment under the BID TOTAL, for “(PUR-1355) Snow Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Airblast System and Carrier Vehicle” at the Hagerstown Regional Airport - Richard A. Henson Field in strict accordance with the aforesaid documents, and to be substantially completed within three hundred sixty (360) consecutive calendar days of notice to proceed.

_____ Dollars (\$ _____)

(Amount shall be shown in **both** words and figures. In case of discrepancy, the amount shown in words will govern.)

B. Anticipation of the Award shall be made by the Board of County Commissioners to the lowest responsive, responsible bidder based on the Bid Total.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) consecutive calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will be issued a purchase order which shall serve as Notice to Proceed.

The Bid Security attached in the sum of _____ Dollars (\$ _____), is to become the property of the Owner in the event the Contract and Bond(s) are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

By _____
(Signature)

(Name & Title Printed)

(Business Address)

(Phone Number)

(SEAL) If bid is by corporation

(Registered MD Contractor No.)

(Date Issued)

PUR-1355
SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY PLOW
AND AIRPORT RUNWAY BROOM WITH AIRBLAST SYSTEM AND CARRIER VEHICLE

SCHEDULE OF PRICES

Item No.	Description / Written Price (per Unit)	Unit	Quantity	Unit Price	Total Price
SRE-200.1	Snow Removal Equipment – One (1) Multi-Purpose Airport Rotary Plow, Airport Runway Broom with Airblast System and Carrier Vehicle _____ Dollars (Written) _____ Cents per (Written)	L.S.	1		
Total Sum of Item <u>SRE-200.1</u>					
				\$ _____	
_____ Dollars (Written)				(Written in Numerals)	
_____ per Cents (Written)					

PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY
PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

BID BOND

KNOWN ALL MEN BY THESE PRESENTS, that we _____
as Principal, hereinafter called the Principal, and _____,
a corporation duly organized under the laws of the State of _____,
as Surety, hereinafter called the Surety, are held and firmly bound unto the Board of County
Commissioners of Washington County, Maryland, hereinafter called the County, for the sum of
_____ dollars (\$_____),
for the payment of which sum, the said Principal and said Surety bind ourselves, our heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted for a Bid for the procurement of “**(PUR-1355) Snow
Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway
Broom with Carrier Vehicle**”, NOW, THEREFORE, if the Principal, upon acceptance by the County of
its Bid identified above, within the period specified herein for acceptance shall execute such further
contractual documents, if any, and give such bond(s) as may be required by the terms of the Bid as
accepted within ten working days after receipt of the forms, or in the event of failure so to execute such
further contractual documents and give such bonds, if the Principal shall pay the County for any cost of
procuring the work which exceeds the amount of its Bid, then the above obligation shall be void and of
no effect.

The surety executing this instrument hereby agrees that its obligation shall not be impaired by any
extension(s) of the time for acceptance of the Bid that the Principal may grant to the County notice of
which extension(s) apply only with respect to extensions aggregating not more than ninety (90) calendar
days in addition to the period originally allowed for acceptance of the Bid.

In presence of _____ Individual Principal _____

Witness _____ as _____ to

_____ (Seal)

In presence of _____ Co-Partnership Principal

Witness _____ (Seal)
Name of Co-Partnership

_____ as to By: _____ (Seal)

_____ as to By: _____ (Seal)

_____ as to By: _____ (Seal)

Corporate Principal

AFFIX:

By: _____ Corporate President _____ (Seal)

Surety

ATTEST:

Signature President Title: _____

Signature Bonding Agent's Name _____

Business Address of Surety _____

Agent's Address _____

PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

LABOR AND MATERIAL PAYMENT BOND

Board of County Commissioners of Washington County, Maryland

BOND NO. _____ **CONTRACT NO.** _____

Date Bond Executed: _____

KNOW ALL MEN BY THESE PRESENTS, that we _____

(Here insert full name and address or legal title of Contractor, including zip code)

Hereinafter called the **Principal** and _____
(Here insert full name and address or legal title of Surety,
including zip code)

a corporation organized and existing under the laws of the State of _____, and authorized to transact business in the State of Maryland, hereinafter called the **Surety**, are held and firmly bound unto the Board of County Commissioners of Washington County, Maryland, a body corporate and politic, hereinafter called the **County**, for the use and benefit of claimants as hereinafter defined, in the Penal Sum of _____ Dollars (\$ _____) lawful money, for the payment of which Penal Sum we bind ourselves, our heirs, executors, administrators, personal representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County, for (PUR-1355) Snow Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Carrier Vehicle at the Hagerstown Regional Airport - Richard A. Henson Field in Washington County, Maryland. The contract and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed thereunder or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred to as the **Contract**.

WHEREAS, it is one of the conditions precedent to the final award of the Contract that these presents be executed.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials furnished, supplied and reasonably required for use in the performance of the Contract, then this obligation shall be null and void, otherwise it shall remain in full force and effect, subject to the following conditions:

1. A **Claimant** is defined to be any and all of those persons supplying labor and materials (including lessors of the equipment to the extent of the fair market value thereof) to the Principal or its subcontractors and sub-subcontractors in the prosecution of the work provided for the Contract, entitled to the protection provided by Md. Code Ann., State Finance and Procurement Article, §§ 17-101, *et seq.*, as from time to time amended.
2. The above-named Principal and Surety hereby jointly and severally agree with the County that every claimant as herein defined, who has not been paid in full may, pursuant to and when in compliance with the provisions of the aforesaid State Finance and Procurement Article, §§ 17-101, *et seq.*, sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.

The Surety hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Payment Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or the Specifications.

This Payment Bond shall be governed and construed in accordance with the laws of the State of Maryland and any reference herein to the Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, the Principal and Surety have set their hands and seals to this Payment Bond this _____ day of _____, 2017.

WITNESS:

(Typed Name of Principal)

BY: _____ (SEAL)

(Typed Name and Title)

WITNESS:

(Typed Name of Surety)

BY: _____ (SEAL)

(Typed Name and Title)

(Name of Local Agent)

(_____) _____
(Telephone Number of Local Agent)

PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

PERFORMANCE BOND

Board of County Commissioners of Washington County, Maryland

BOND NO. _____

CONTRACT NO. _____

Date Bond Executed: _____

KNOW ALL MEN BY THESE PRESENTS, that we _____

_____,
(Here insert full name and address or legal title of Contractor, including zip code)

a corporation of the State of _____ and authorized to do business in
the State of Maryland, hereinafter called the **Principal** and _____

(Here insert full name and address or legal title of Surety, including zip code)

hereinafter called the **Surety**, are held and firmly bound unto the Board of County Commissioners of Washington County, Maryland, hereinafter called the **County**, the sum of _____ Dollars (\$ _____) lawful money of the United States for the payment of which sum well and truly to be made, the Principal and the Surety bind themselves, their heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County for "(PUR-1355) Snow Removal Equipment – One (1) New Multi-Purpose Airport Rotary Plow and Airport Runway Broom with Carrier Vehicle at the Hagerstown Regional Airport - Richard A. Henson Field, in Washington County, Maryland, which contract and work to be done thereunder and the plans, drawings, and specifications accompanying the same shall be deemed a part hereof and incorporated by reference herein to the same extent as if fully set forth.

NOW, THEREFORE, during the original term of said Contract, during any extensions thereto that may be granted by the County, and during the guarantee and warranty period, if any, required under the Contract, unless otherwise stated therein, this Performance Bond shall remain in full force and effect unless and until the following terms and conditions are met:

1. Principal shall well and truly perform the Contract; and
2. Principal and Surety shall comply with the terms and conditions in this Performance Bond.

Whenever Principal shall be declared by the County to be in default under the Contract, the Surety may, within 15 days after notice of default from the County, notify the County of its election

to either promptly proceed to remedy the default or promptly proceed to complete the contract in accordance with and subject to its terms and conditions. In the event the Surety does not elect to exercise either of the above stated options, then the County thereupon shall have the remaining contract work completed, Surety to remain liable hereunder for all expenses of completion up to but not exceeding the penal sum stated above.

The Surety for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Performance Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder of the specifications accompanying the same.

This Performance Bond shall be governed by and construed in accordance with the laws of the State of Maryland and any reference herein to Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, Principal and Surety have set their hands and seals to this Performance Bond. If any individual is a signatory under the Principal heading below, then each such individual has signed below on his or her own behalf, has set forth below the name of the firm, if any, in whose name he or she is doing business, and has set forth below his or her title as a sole proprietor. If any partnership or joint venture is a signatory under the Principal heading below, then all members of each such partnership or joint venture, and each member has set forth below his or her title as a general partner, limited partner, or member of joint venture, whichever is applicable. If any corporation is a signatory under the Principal or Surety heading below, then each such corporation has caused the following: the corporation's name to be set forth below, a duly authorized representative of the corporation to affix below the corporation's seal and to attach hereto a notarized corporate resolution or power of attorney authorizing such action, and each such duly authorized representative to sign below and to set forth below his or her title as a representative of the corporation. If any individual acts as a witness to any signature below, then each such individual has signed below and has set forth below his or her title as a witness. All of the above has been done as of the Date of Bond shown above.

Signed, and sealed this _____ day of _____, 2017, in three counterparts each of which shall without proof of accounting for the other counterparts be deemed an original hereof.

WITNESS:

(Typed Name of Principal)

BY: _____
(SEAL)

(Typed Name and Title)

WITNESS:

(Typed Name of Surety)

BY: _____ (SEAL)

(Typed Name and Title)

(Name of Local Agent)

() _____
(Telephone Number of Local Agent)

PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

BIDDER'S AFFIDAVIT

1. Authorized Representative:

I HEREBY DECLARE AND AFFIRM that I am the _____ and duly
authorized representative of the firm of _____
(Title)
whose address is _____ and that

I am duly authorized on behalf of said firm to make this Affidavit.

2. Bribery:

I FURTHER DECLARE AND AFFIRM that neither I, nor, to the best of my knowledge, information and belief, the above firm, nor any officer, director or partner of the above firm, nor any employee of the above firm directly involved in obtaining contracts with the State of Maryland, or any county or other subdivision of the State of Maryland, has been convicted* of bribery, attempted bribery, or conspiracy to bribe under the laws of any state or the Federal Government; except as herein expressly stated (if any):

* As used in the word "convicted" includes an accepted plea of nolo contendere.

3. Non-Collusion:

In connection with the firm's price proposal for the above-captioned contract, as submitted to Washington County, Maryland, I HEREBY DECLARE AND AFFIRM, to the best of my knowledge, information and belief, that:

1. Said proposal has been independently prepared without collusion by any officer, director, partner, employee or other representative of this firm, with any other proposer, or with any competitor; that

2. No attempt has been or, hereafter, will be made by any officer, director, partner, employee or other representative of this firm to induce any other person, firm or entity to submit or not submit a proposal; that

3. Any unit or total price in this proposal has not been knowingly disclosed and will not be knowingly disclosed prior to its official opening, directly or indirectly, to any other bidder or to any competitor; and, that

4. I have fully informed myself regarding the accuracy of the statements contained herein. I acknowledge that this Affidavit is to be furnished to the Secretary of the Maryland Department of Transportation and may be distributed to boards, commissions, administrations, departments and agencies of the State of Maryland, counties or other subdivisions of the State of Maryland, other states and the Federal Government. I further acknowledge that this Affidavit is subject to

applicable laws of the State of Maryland, both criminal and civil, and that this Affidavit is to be attached to and become a part of the contract when and if awarded and executed.

I FURTHER HEREBY DECLARE AND AFFIRM that I and the firm I herein represent, acknowledge and agree that if any misrepresentation is herein made, the Board of County Commissioners of Washington County, in their discretion, shall have the right to reject this proposal or terminate the contract, without liability, (as the case may be).

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THE FOREGOING DOCUMENT ARE TRUE AND CORRECT.

(Date)

By: _____
(Affiant)

Title: _____

For: _____

State of _____:

County (City of) _____:

On this _____ day of _____, 2017, before me, _____ the undersigned officer, personally appeared _____, known to me to be the person described in the foregoing Affidavit and acknowledged that he (she) executed the same in the capacity therein stated and for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

NOTARY PUBLIC

My commission expires _____ NOTARY SEAL

PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES

A. **General** - For the purpose of these requirements, the following terms as defined below shall apply:

Administration Representative - MBE Officer or an employee of the County or County's authorized representative, the Federal Aviation Administration, or Department of Economic and Employment Development (D.E.E.D.) who deals with laws and regulations pertaining to minority business enterprise.

Best Efforts - means that the party in question shall, to the maximum extent permitted by law, use all of its powers toward achievement of the 1% minimum goal for utilization of MBE's.

Business Enterprise - is any legal entity which is organized in any form other than as a joint venture to engage in lawful commercial transactions whether profit or non-profit, e.g., sole proprietorship, partnership, corporation.

Control - means the primary power, direct or indirect, to influence the management and operation of a business enterprise.

Joint Venture - An association of two or more persons, partnerships, corporations or any combination thereof, formed to carry on a single business activity which is limited in scope and duration. Unlike partnerships and corporations, a joint venture is an association usually intended to exist only for a single business endeavor. A joint venture is not considered a minority business enterprise, regardless of the percentage of minority participation.

Minority Business Enterprise (MBE) - A small business concern as defined pursuant to Section 3 of the Small Business (15 USC 637(a)) and implementing regulations (49 CFR Part 23), which is owned and controlled by one or more minorities or women. For the purpose of the program, owned and controlled means a business:

1. Which is at least 51 percent owned by one or more minorities or women, or in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more minorities or women; and
2. Whose management and daily business operations are controlled by one or more minorities or women, pursuant to the Minority Business Enterprises Program Guidelines set forth by D.E.E.D.

Minority Person - An individual who is a citizen or lawful permanent resident of the United States and who is Black, Hispanic, Asian American, Pacific Islander, Alaskan Native, American Indian, physically and/or mentally disabled, women, regardless of race or ethnicity, pursuant to the D.E.E.D. Minority Business Enterprise Program.

MBE Directory - A compilation of minority businesses provided to the contractor for use in identifying subcontractors, material supplier, etc. (published by MDOT).

MBE Participation Program - Means the documents submitted by the bidder or the proposer pursuant to the appropriate special bid provisions. The Minority Participation Program will consist of the Schedule for Participation of MBE's, the Minority Contract Project Disclosure and Participation Statement and, where appropriate, the Joint Venture Affidavit and the Unavailability Certificate.

B. Bidder's Action

1. The bidder shall procure, by subcontract or otherwise, supplies and services, the combined value of which equals or exceeds 1 percent of the total value of the contract, from minority business enterprises (MBEs). Unless procured directly from an MBE manufacturer, procurement items purchased separately cannot comprise more than 20% of the 1% goal. Additional procurement from MBEs will be only credited when in excess of the 1% percent goal. Prior to the award and within fourteen (14) days after the bid opening, the apparent low bidder shall develop and submit to the Administrative Representative for approval an Affirmative Action Plan for the use of minority and women business enterprises. The bidder may request, in writing, an extension of the above stated time for an additional fourteen (14) days for the submittal of the Affirmative Action Plan. The extension of time shall have the approval of the County's authorized representative(s).

The Affirmative Action Plan shall include as a minimum:

- a. The name of an employee designated as the bidder's liaison office for minority affairs, and whom will be responsible for achieving the 1% minimum goal.
- b. A completed Schedule for Participation of minority business enterprises.
- c. A Minority Contractor Project Disclosure and Participation Statement, completed and signed by the bidder and MBE for each business listed in the Schedule for Participation.
- d. When a bidder intended to attain the 1% goal for a minority enterprise participation by use of a joint venture, it must submit a Joint Venture Disclosure Affidavit showing the extent of MBE participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit must be submitted through the bidder by the proposed subcontractor and signed by all parties. Any MBE which intends to act as a joint venture,

whether prime or subcontractor, must submit a completed Minority Business Enterprise Disclosure Affidavit.

2. If the bidder is unable to procure, by subcontract or otherwise, supplies and services equaling at least 1% of the value of the prime contract from MBEs, he will request, in writing, an exception of this requirement. This request that no qualified MBE is available from which such supplies and services may be procured, will be concurred in writing by the Department of Economic and Employment Development. To obtain such an exception, the bidder must submit the following information:
 - a. A detailed statement of the efforts made to contact and negotiate with MBEs including: (I) the dates, names, addresses and telephone numbers of MBEs who were contacted; (ii) a description of the information provided to MBEs regarding the work to be performed; (iii) a detailed statement of the reasons why additional prospective agreements with MBEs were not reached.
 - b. A detailed statement of the efforts made to select portions of the work proposed to be performed by MBEs in order to increase the likelihood of achieving the goal.
 - c. For each MBE contacted but considered not qualified, a detailed statement of the reasons for the bidder's conclusion.
 - d. For each MBE contacted but unavailable, (I) a Minority Contractor Unavailability Certification signed by the minority business enterprise, or (ii) a statement from the bidder that the MBE refused to give such written certification after reasonable request must be submitted.
3. Investigate the extent of services offered by minority-owned banks in the local community and determine the most feasible area in which to utilize the services of these banks.
4. Maintain records showing actions which have been taken to comply with procedures set forth herein.
5. Cooperate with the County and the Department of Economic and Employment Development (D.E.E.D.) Representative in any reviews of the contractor's procedures and practices with respect to minority business enterprises which the Administration Representative may from time to time conduct.
6. Failure to comply with this section will result in rejection of the contractor's bid.

C. Records and Reports

1. The Contractor shall keep such records as are necessary to determine compliance with its Minority Business Enterprises Utilization obligations. The records kept by the Contractor will be designed to indicate:

- a. The number of minority and non-minority subcontractors and suppliers and the type of work or materials or services being performed on or incorporated in this project.
 - b. The progress and efforts being made in seeking out minority contractor organizations and individual minority contractors for work on this project.
 - c. Documentation of all correspondence, contracts, telephone calls, etc. to obtain the services of minority business enterprises for work on this project.
2. The Contractor will submit reports on a quarterly basis of those contracts and other business transactions executed with minority business enterprises with respect to the records referred to in Paragraph C-1 above, in such form, manner, and content as prescribed by the County and the D.E.E.D. The Quarterly Reports will be submitted within 21 calendar days following the last calendar day of the quarter. If the Contractor cannot submit the report on time, they shall notify the County and the D.E.E.D. Representative and request additional time to submit the report. Additional reports may be required by the County and the D.E.E.D. upon written request.
 3. All such records must be maintained for a period of three years following acceptance of final payment and will be available for inspection by the County and the Department of Economic and Employment Development

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BIDDER’S DBE CERTIFICATION

I do hereby certify that it is the intention of the organization, listed below, to affirmatively seek out and consider disadvantaged business enterprises to participate in this contract as subcontractors and/or suppliers of materials and services.

I understand and agree that any and all subcontracting of supplies and services in connection with this contract, whether undertaken prior to or subsequently to award of contract, will be in accordance with this provision. I also understand and agree that no subcontracting will be approved until the County and the Department of Economic and Employment Development has reviewed and approved the affirmative actions taken by the above organization.

I acknowledge that this Certification is to be an integral part of the proposal form for the above numbered project.

If awarded to contract for the improvements, we shall use our best efforts to achieve the 1% minimum DBE goal set forth herein and will report on the specific efforts taken to meet that goal.

AUTHORIZED REPRESENTATIVE	DATE	WITNESS
NAME		
TITLE		
COMPANY	(SEAL)	

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SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE

**CERTIFICATE OF BUY AMERICAN COMPLIANCE
FOR MANUFACTURED PRODUCTS (FOR AIP CONTRACT PROJECTS)**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:
- a) Only installing steel and manufactured products produced in the United States, or;
 - b) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing, or;
 - c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
 2. To faithfully comply with providing US domestic product
 3. To furnish US domestic product for any waiver request that the FAA rejects
 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- The bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
1. To the submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
 3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 3 Waiver - The cost of the item components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the “item”. The required documentation for a type 3 waiver is:

- a) Listing of all product components and subcomponents that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- c) Percentage of non-domestic component and subcomponent cost as compared to total “item” component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

See attached Buy America Waiver Request, Component Cost Calculation Table and Final Assembly Questionnaire.

Type 4 Waiver - Total cost of project using US domestic source product exceeds the total project cost using non-domestic product by 25%. The required documentation for a type 4 of waiver is:

- a) Detailed cost information for total project using US domestic product
- b) Detailed cost information for total project using non-domestic product

See attached Buy America Waiver Request.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

Buy America Waiver Request

Title 49 U.S.C Section 50101 (b)

For Equipment and Vehicles (ARFF and SRE) Procured under the Airport Improvement Program

Type of Waiver Request:

The bidder may request a waiver subject to the provisions of Section 50101 (b) (1), Section 50101 (b) (2), Section (b) (3) or Section 50101 (b) (4). The Owner's approval of the bidders request is contingent upon Federal Aviation Administration (FAA) approval with the waiver request. The bidder must select one of the following applicable waiver provisions:

- Section 50101 (b) (1): Bidder hereby requests a waiver to Buy America preferences based upon Section 50101(b) (1). Applying subsection 50101 (a) *Preference*, would be inconsistent with the public interest. (See approval level below).
- Section 50101 (b) (2): Bidder hereby requests a waiver to Buy America preferences based upon Section 50101 (b) (2). The steel and goods produced in the United States are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality. (See approval level below).
- Section 50101 (b) (3): Bidder hereby requests a waiver to Buy America preferences based upon Section 50101 (b) (3). The bidder further certifies _____% of the cost of components and subcomponents comprising the facility are produced in the United States and that final assembly occurs with the United States. (*Bidder must attach a copy of the component cost calculation table*).
- Section 50101 (b) (4): Bidder hereby requests a waiver to Buy America preferences based upon Section 50101 (b) (4). The bidder asserts provision of domestic material increases the cost of the overall project by more than 25%.

Certification Signature

In accordance with Section 50101 (b), we request a waiver to the Buy America provisions based on the above certification and attached documentation.

Bidder's Firm Name

Date

Signature

COMPONENT COST CALCULATION TABLE

- In lieu of completing this table, bidder may prepare a spreadsheet that addresses the same information and calculations as presented herein.
- An authorized person shall attest under signature and date that the submitted information is accurate and complete.
- The bidder/contractor shall submit the signed component cost calculation table to the Owner as an attachment to the waiver request.
- The component breakout shall be along major elements of the equipment. Inadequate breakout of components is cause for owner rejection of the waiver request.

Component/Subcomponents	Name of Manufacturer	Country of Origin	Cost of Foreign Manufactured Components/Subcomponents	Cost of USA Manufactured Components/Subcomponents

Sum of US Manufactured Component/Subcomponent Costs: _____
Sum of all Equipment Components and Subcomponents: _____
Percentage of Equipment Components Manufactured in the United States: _____
Place of Final Assembly: _____

Certification Signature
I hereby certify the above information is accurate and complete.

 Bidder's Firm Name Date

 Signature

Amount Listed above include the cost of the vehicle only.
 The following items are not included in the calculation:

- Delivery of Completed Vehicle
- On-Site Training
- Communications Equipment
- Auxiliary Equipment
- Manuals



FAA
Office of Airports Planning and Programming

Buy American Preferences - Final Assembly Questionnaire

To assist the Federal Aviation Administration (FAA) in making the determination of whether final assembly of the product occurs in the United States, please complete and submit this questionnaire when requesting a Buy American Waiver under 49 U.S.C. 50101(b)(3)(A).

1. Please provide a description of the assembly process occurring at the specified final location in the United States?

Please describe the final assembly process and its various operations?

How long does the final assembly process take to complete?

2. Please provide a description of the resources used to conduct the assembly of the product at the specified location in the United States?

How many employees are involved in the final assembly process and what is the general skill level of those employees?

What type of equipment is used during the final assembly process?

What is a rough estimate of the associated cost to conduct final assembly of the product at the specified location in the United States?

BID NO. PUR-1355

CONTRACT FORMS, BID FORMS AND SPECIFICATIONS

**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE
AIP-3-24-0019-xxx-2017
MAA-GR-xxx-17**

PREPARED FOR THE

**HAGERSTOWN REGIONAL AIRPORT –
RICHARD A. HENSON FIELD
HAGERSTOWN, MARYLAND**

SECTION II

**FEDERAL REQUIREMENTS
FOR AIP PROJECT CONTRACTS**



PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

FEDERAL REQUIREMENTS FOR AIP CONTRACTS

GENERAL

The contractor (including all subcontractors) agrees to insert the following Federal contract provisions in each lower tier contract(s) (e.g. subcontract or sub-agreement) and to incorporate the applicable requirements of these contract provisions by reference for work done under any purchase orders, rental agreements and other agreements for supplies or services. The contractor also agrees to be responsible for compliance with these contract provisions by any subcontractor, lower-tier subcontractor or service provider.

A. ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the sponsor, the Federal Aviation Administration, and the Comptroller General of the United States or any of their duly authorized representatives, access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

B. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

C. BUY AMERICAN PREFERENCE

The contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

A bidder or offeror must complete and submit the Buy America certification included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include a completed Certificate of Buy American Compliance.

D. CIVIL RIGHTS – GENERAL

General Civil Rights Provisions

The contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the contractor and sub tier contractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

E. CIVIL RIGHTS – TITLE VI ASSURANCE

Title VI Solicitation Notice

The Board of County Commissioners of Washington County, Hagerstown, Maryland, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Title VI Compliance with Nondiscrimination Requirements

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

- 1. Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts And Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
- 2. Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination

prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

- 3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Nondiscrimination Acts And Authorities on the grounds of race, color, or national origin.
- 4. Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts And Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
- 5. Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
 - a. Withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
- 6. Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

- 49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*)

F. CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 U.S.C. § 740-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceeds \$150,000.

G. DEBARMENT AND SUSPENSION

Certification of Offeror/Bidder Regarding Debarment

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

Certification of Lower Tier Contractors Regarding Debarment

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”, must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>
2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract

If the FAA later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

H. DISADVANTAGED BUSINESS ENTERPRISE

Solicitation Language

The Owner’s award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

As a condition of bid responsiveness, the Bidder or Offeror must submit the following information with their proposal on the forms provided herein:

1. The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2. A description of the work that each DBE firm will perform;
3. The dollar amount of the participation of each DBE firm listed under (1)
4. Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner’s project goal;
5. If Bidder or Offeror cannot meet the advertised project DBE goal; evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR Part 26.

The requirements of 49 CFR part 26 apply to this contract. It is the policy of the Board of County Commissioners of Washington County, Hagerstown, Maryland to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

Contract Assurance (§ 26.13)

The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate.

Prompt Payment (§26.29)

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 calendar days from the receipt of each payment the prime contractor receives from the Owner. The prime contractor agrees further to return retainage payments to each subcontractor within 30 calendar days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Owner. This clause applies to both DBE and non-DBE subcontractors.

I. DISTRACTED DRIVING

Texting When Driving

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 "Text Messaging While Driving" (12/30/2009), the FAA encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or sub-grant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500 and involve driving a motor vehicle in performance of work activities associated with the project.

J. ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201*et seq.*).

K. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division

L. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

Certification Regarding Lobbying

The bidder or offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

M. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to monitor its compliance and their subcontractor’s compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

N. PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use of products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1. The contract requires procurement of \$10,000 or more of a designated item during the fiscal year; or,
2. The contractor has procured \$10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/epawaste/consERVE/tools/cpg/products/.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

1. Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
2. Fails to meet reasonable contract performance requirements; or
3. Is only available at an unreasonable price.

O. TERMINATION OF CONTRACT

Termination for Convenience (Construction & Equipment Contracts)

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.
2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
3. Discontinue orders for materials and services except as directed by the written notice.
4. Deliver to the owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.
5. Complete performance of the work not terminated by the notice.
6. Take action as directed by the owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1. completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;

2. documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
3. reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
4. reasonable and substantiated expenses to the contractor directly attributable to Owner's termination action

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

Termination for Default (Equipment)

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract if the Contractor:

1. Fails to commence the Work under the Contract within the time specified in the Notice- to-Proceed;
2. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
3. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
4. Fails to comply with material provisions of the Contract;
5. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements;
6. Becomes insolvent or declares bankruptcy;

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within [10] days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment, such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the Work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience the Owner.

The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this contract.

P. TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror -

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (U.S.T.R.);
2. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the U.S.T.R; and
3. has not entered into any subcontract for any product to be used on the Federal on the project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the U.S.T.R.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

1. who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the U.S.T.R. or
2. whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such U.S.T.R. list or
3. who incorporates in the public works project any product of a foreign country on such U.S.T.R. list;

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country

included on the list of countries that discriminate against U.S. firms as published by U.S.T.R, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

Q. VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

BID NO. PUR-1355

CONTRACT FORMS, BID FORMS AND SPECIFICATIONS

**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

AIP-3-24-0019-xxx-2017

MAA-GR-xxx-17

PREPARED FOR THE

**HAGERSTOWN REGIONAL AIRPORT –
RICHARD A. HENSON FIELD**

HAGERSTOWN, MARYLAND

SECTION III

TECHNICAL SPECIFICATIONS



PUR-1355
**SNOW REMOVAL EQUIPMENT – ONE (1) NEW MULTI-PURPOSE AIRPORT
ROTARY PLOW AND AIRPORT RUNWAY BROOM WITH CARRIER VEHICLE**

**SRE-200 - Snow Removal Equipment - Multi-Purpose Airport Rotary Plow, Airport Runway
Broom with Airblast System and Carrier Vehicle**

This specification for the purchase of one (1) newest model year, Multi-Purpose Equipment for High Speed Airfield Snow Removal to include Carrier Vehicle, Class V, 3,000 tph Rotary Plow, Rotary Broom and High Pressure Velocity Air as developed around Federal Aviation Administration (FAA) Advisory Circular (AC) 150-5220-20A and SAE Aerospace Recommended Practice (ARP).

The basic vehicle to be purchased under these specifications shall conform in all respects to the minimum requirements set forth in the Advisory Circular and SAE as issued.

The vehicle shall be delivered with all specified ancillary appliances complete, by flatbed truck freight.

Multi-Purpose Airport Rotary Plow, Airport Runway Broom with Airblast System and Carrier Vehicle

SCOPE:

This specification, in accordance with the FAA Advisory Circular AC 150/5220-20A and SAE Aerospace Recommended Practice (ARP) as noted, covers requirements for a rotary plow and runway broom with carrier vehicle primarily used to cast heavy concentrations of snow away from airport operational areas such as runways and taxiways. The term carrier vehicle represents the various self-propelled prime movers that provide the power necessary to move snow and ice control equipment during winter operations.

REFERENCES:

Applicable Documents: The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of a conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

- SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Internet address: <http://www.sae.org>
- Society of Automotive Engineers Aerospace Recommended Practice SAE ARP5539, Rotary Plow With Carrier Vehicle and SAE ARP5564, Airport Runway Brooms.
- SAE J931 Hydraulic Power Circuit Filtration
- FAA Advisory Circular AC 150/5220-20A
- FAR and FAA Publications from FAA: Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Internet address: <http://www.faa.gov>
- AC 150/5200-30A Airport Winter Safety and Operations
- AC 150/5200-18 Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials
- AC 150/5210-5D, Painting, Marking, and Lighting of Vehicles on an Airport

- FMCSR Publications from FMCSA: Available from Federal Motor Carrier Safety Administration, 400 Seventh Street SW., Washington, DC, 20590; Internet address: <http://www.fmcsa.dot.gov>
- Title 49, Chapter III, Subchapter B-Federal Motor Carrier Safety Regulations (Title 49)

In accordance with FAA Advisory Circular AC 150/5220-20A, section 3-1, the high-speed rotary snow plow, also called herein a snowblower, shall be used primarily to cast heavy concentrations of snow away from movement areas such as runways and taxiways. In accordance with section 3-1.a., the equipment, which shall be attached to a carrier vehicle, shall be two-stage type to disaggregate snowpack. The two-stage high speed rotary snow plow shall separate the disaggregating function from the casting function. The disaggregator design shall be a ribbon reel and the impellor shall be a disk design. The disaggregated snow shall be broken into particles small enough to pass through a casting mechanism and directional chute. Because of the large capacity, the snowblower and carrier vehicle shall be a single engineered system.

In accordance with AC 150/5220-20A, section 3-1.c. to meet the demands of local conditions, the airport selects various equipment options which are available in order to acquire the most effective unit.

The high speed rotary snow plow and carrier vehicle shall be in accordance with AC 150/5220-20A section 3-3 and SAE ARP5539, rotary Snow Plow with Carrier Vehicle. An additional specification requirement is for that for carrier vehicle controllability and safety, all-wheel drive must be provided.

In accordance with AC 150/5220-20A, Appendix 1, Part A, the following Airport Operator Checklist shall be part of these specifications. Part A tailors the carrier vehicle to the specific requirements of this purchaser and Part B defines the specification to meet these requirements.

FAA AC 150/5220-20A
Appendix 1 Specification for Carrier Vehicle
Part A, the following Airport Operator Checklist

A1-1. Anticipated uses and/or features of the vehicle

- The snow blower shall be used to move snow during large and small snow events at the airport. The dual stage, high capacity, high speed snowblower shall be heavy duty to withstand the extreme winter conditions found in the airport environment.

A1-2. Performance requirements

- Working speed: from 0 to 45 miles per hour
- Minimum speed: 5 miles per hour
- Turning radius: maximum 57.5 feet wall to wall

A1-3. Engine/transmission

- The transmission shall be automatic shifting type
- The carrier vehicle drive and engine and the snow blower engine shall be diesel
- The transmission shall have four forward speeds maximum

A1-4. Transfer case

- Automatic locking differential

A1-5. Axle capacities

- a. Front 29,000 lbs
- b. Rear 23,000 lbs

A1-6. Fuel capacity

- a. Minimum of 250 gallon fuel tank is required

A1-8. Materials and components

- a. See referenced SAE ARP equipment specification.

A1-9. Delivery, Preparation for delivery

- a. Shipment. The vendor is responsible for the safe and timely delivery of the vehicle and its accessories, spare parts, and tools to the agreed place of delivery at the airport.
- b. Marking. The carrier vehicle must be marked for shipment in accordance with instructions agreed to by the vendor and the airport.
- c. Instruction and training. Within two weeks of arrival, at a mutually arranged time, the manufacturer must, at no additional cost, furnish the services of trained personnel to the purchaser at a time and place agreed to by all parties. These individuals must provide instruction to airport personnel sufficient for the personnel to familiarize themselves with the operation and maintenance of the carrier vehicle and its auxiliary equipment. The period of instruction must not be less than 24 hours or as required by crew size.

**FAA AC 150/5220-20A
Appendix 2 Optional/Alternate Equipment Specification**

In accordance with AC 150/5220-20A, Appendix 2, Optional/Alternate Equipment Specification, the following shall be part of these specifications.

A2-1. General

Most snow and ice control equipment is designed to operate under normal winter conditions. At various times, working tolerances and/or severe weather or operating conditions require specialized support equipment to assist the primary unit prior to or during operation. Several of these options are discussed below:

A2-2. Carrier vehicle

Equipment to be considered when operating a carrier vehicle at or below -40°F (-40°C) or when the vehicle must be stored outside or in an unheated building is as follows:

- a. Engine/transmission. – no inclement weather package required
- b. Vehicle cab.
 - 1) Additional door handles. Handles must be installed on lower part of vehicle cab door.
 - 2) Auxiliary cab heater and circulating fans.
 - 3) Mirrors.
 - a) Remote control for exterior mirrors.
 - b) Electrically heated exterior mirrors.
 - 4) Windows.
 - a) Heated windshield.
 - b) Extra window in lower part of cab doors.
 - c) Reverse slope windshield.

- 5) Seats.
 - a) Heated driver seat.
- 6) Cab insulation per section 4.17.1
- 7) Air horn.
- c. Mechanical.
 - 1) Special starting systems.
 - i. Dual battery system.
 - ii. Ether cold starting system.
 - 2) Permanently installed battery charger.
 - a) Maintenance charging. (0-10 amp capacity)
 - b) Automatic cutoff.
 - c) Connection.
 - i. Weather resistant and chassis mounted.
 - ii. Adaptable to 110 volt electrical outlet
 - iii. Heavy duty
 - iv. 20 amp capacity
 - 3) Engine cooling.
 - a) Oversize radiator.
 - 4) Automatic engine shutdown. An automatic engine shutdown system is equipped with an override switch to prevent engine damage due to low engine oil pressure, high coolant temperature, or low coolant level.
 - 5) Alternator. - Amperage capacity requirement shall be a minimum 270 amps
 - 6) All-wheel steering. The rear drive-steer axle must be controlled in the cab.
 - 7) Silicone hoses with constant torque clamps
- d. Quick disconnect hitches.
 - 1) Automatic/remote hitch – not required
 - 2) Semi-automatic hitch. The initial hook-up between carrier vehicle and hitching device must be controlled from the vehicle cab with final lock-on accomplished manually at the vehicle/ hitch interface. The hitch must be capable of initial hook-up even when minor angular differences exist between the plow attachment points and the hitching assembly. All manual locking devices must ensure a safe and positive final coupling.

AC 150/5220-20A
Appendix 3. High-Speed Rotary Plow Specification
Part A – Airport Operator Checklist

In accordance with AC 150/5220-20A, Appendix 3. High-Speed Rotary Plow Specification

A3-1. This high speed dual stage rotary snow plow and carrier chassis will be equipped with a spot casting and loading chute used to cast snow from the aircraft movement area in both large and small storms. The unit shall be classified as a Very Large Class V high speed rotary snow plow per the AC 150/5220-20A Table 2.3.

A3-2. Size of priority 1 paved area: 2,000,000 ft²

A3-3. Capacity minimum: 3,000 tons per hour

A3-4. Casting distance minimum: 150 feet

- A3-5. Anticipated speed of operation:** 0-45 miles per hour
- A3-6. The airport has normal obstructions expected to be found at any commercial airport.**
- A3-7. Other/optional equipment:** Two (2) sets of ¾” steel cutting edges and two (2) sets of skid shoes shall be provided.
- A3-8.** See paragraph 3.3 of the AC 150/5220-20A
- A3-9.** High-speed rotary plows and carrier vehicles must be in accordance with SAE ARP 5539, Rotary Plow with Carrier Vehicle. Additional Federal AIP/PFC specification requirement for SAE ARP 5539 is that for carrier vehicle controllability and safety, all-wheel drive must be provided.

FAA AC 150/5220-20A
Appendix 6, Runway broom with Airblast Specification
Part A - Airport Operator Checklist

In accordance with AC 150/5220-20A, Appendix 6, Runway broom with Airblast Specification

- A6-1.** The airblast system will be used to clear light snow from runway surfaces and to clean up leftover snow accumulations as a result of broom operations.
- A6-2. Size of Priority 1 paved area to be swept:** 2,000,000 ft².
- A6-3. Time required to sweep primary surface areas:** 30 minutes
- A6-4. Sweeper speed needed to meet clearance time:** 45 mph
- A6-5. Type of sweeper desired:** Pushed
- A6-6. Airblast system**
 In accordance with SAE ARP5564; the system shall feature a double inlet centrifugal blower. The centrifugal impellers shall be hydrostatically driven including a variable displacement pump and fixed displacement motors. It shall be capable of varying its speed allowing blower speed from the operator station. Air ducts shall be installed at the outlet of the impellers. Nozzles shall be attached to these air ducts. Nozzle ends shall direct the flow to one side or the other. When the brush is angled, the air blower direction shall be capable of automatically following, directing air perpendicular to the direction of travel and toward the direction of broom discharge. The nozzles direction control shall be interlocked with the brush head angle to blow in the direction of broom casting thus controlled by the operators’ joystick. A separate control shall allow the nozzle direction opposite of the brush angle by choice. The controls shall permit blowing without broom operation. All controls for the air blast shall be operated from the operator station. The air ducts shall retract within the width of the vehicle for transport and storage. There shall be 8 inches of ground clearance, minimum when raised. The impeller shaft assembly shall be dynamically balanced at the rated RPM. The velocity and CFM at each nozzle shall be certified by an independent test facility and supplied with the bid.
- A6-7. Size of broom:** 20’ length, 46” diameter

A6-8. Type of brush: 50 poly / 50 wire combination

FAA AC 150/5220-20A
Appendix 6, Runway broom with Airblast Specification
Part B - Runway Brooms with Airblast Specification

A6-11. Runway Broom with airblast must be in accordance with SAE ARP 5564, Airport Runway Brooms.

A6-12. Optional equipment

Sweepers are designed to operate under normal winter conditions. To improve equipment effectiveness, the purchaser selects the following options to enhance operations:

- a. Air blast system. See paragraph 2-8. See above A6-6.
- b. Quick disconnects shall be provided for all hydraulic hoses/lines and blower head driveline.
- c. Maintenance Free Batteries.
- d. Engine temperature and hydrostatic pressure loss warning devices.

4. TECHNICAL REQUIREMENTS (SAE ARP5539)

Two-Stage Rotary Plow:

4.3.1 Rotary-Head Box

Fabrication shall be of heavy gauge welded alloy steel designed for the type of expected service using best engineering practices. The rotary-head box shall have provisions for vehicle mounts, shoe or caster brackets, scraper blades, drive lines, controls, augers, and impeller bearing mounts and other mechanical hardware. A scraper blade shall be fitted to the lower leading edge of the box which shall be removable and made of ¾” steel. The blade shall run the entire width of the box.

4.3.2 Input Auger

The auger shall have a minimum of two bearing supports. The ribbon shall be driven from both ends hydraulically. The ribbon blades shall be easily replaceable and made of high tensile steel. They shall be bolted or otherwise attached to the auger shaft and balanced to reduce vibration using best engineering practices.

4.3.3 Input Auger

The auger shall have multiple cutter blades mounted on the auger drive shaft. Input auger shall be designed to feed snow to the discharge impeller to be cast away from the vehicle. The solid auger drive shaft shall be balanced and supported by bearings, one at each end of the auger shaft.

4.3.4 Discharge Impeller System

The impeller capacity shall be at least equal to the capacity of the input auger. The impeller blades shall be made of high tensile steel using best engineering practices and be balanced to reduce vibration and shock damage.

4.3.5 Operation of the Rotary System

The operation of turbines shall be by hydraulic means with the speed controlled by a single operator in the vehicle cab. Power shall be transmitted to these systems via mechanisms located on either side of the rotary head box.

4.3.6 Snow Casting Assembly

The snow casting assembly shall consist of a casting chute that can be directionally controlled, an impeller, and a control system. The casting chute shall be able to rotate in either a vertical or horizontal plane, or both, as required by the purchaser. Casting distances shall range from zero to the maximum cast distance of 150 feet as specified by the purchaser. The snow casting chute shall be designed and positioned on the carrier vehicle so as to provide maximum operator visibility. Chute shall be controllable by a single operator from within the vehicle cab.

4.3.7 Rotary Head Assembly

The rotary head assembly shall be equipped with a device that is capable of raising it a minimum of 8 inches from the pavement. The drive system shall not bind, rub, or vibrate excessively when the assembly is being moved. When the vehicle is traveling, the assembly shall have a means to be locked in the raised position. Customer may specify greater heights for local conditions.

4.3.8 Drive Protection System

All auger and impeller assemblies shall be protected against sudden stops or damage that may be caused from foreign objects. Protection for the impeller shall be in the form of shear fasteners while the ribbon shall be in the form of hydrostatic relief valve.

4.3.9 Blower Head Drive Train

Drive shafts, universal joints and other mechanical components of the drive train shall continue to provide power to the head assembly under normal operating conditions through the operating range of the blower head without physical damage.

4.4 Minimum Performance Requirements:

a. Anticipated Uses and/or Features of Rotary Plow

This high speed dual stage rotary snow plow and carrier chassis will be used to cast snow from the aircraft movement area in both large and small storms. The unit shall be classified as a Very Large Class V high speed rotary snow plow per the AC 150/5220-20A Table 2.3.

- b. Capacity (tons/hour): 3,000
- c. Casting Distance 150 ft.
- d. Required Speed of Operation 0-45 mph
- e. Turning Radius
 - i. Wall to wall 57.50' with blowerhead
 - ii. curb to curb 43.58"
- f. The airport has normal obstructions expected to be found at any commercial airport

4.5 Appendix B: no additional

4.6 Carrier Vehicle Description

The term carrier vehicle represents the self-propelled prime mover that provides the power necessary to move snow and ice control equipment during winter operations. The design of the vehicle chassis shall be based on an all-wheel drive concept for optimized performance and safety. Vehicle selection is determined by the purchaser for the mission to be performed and the capacity of the selected equipment. Although this unit may not normally be driven over-the-road, it shall be designed as such, and the following Federal Motor Vehicle Safety Standards shall apply as though they were an on-highway vehicle:

- FMVSS 101 Controls & Displays
- FMVSS 102 Transmission Shift Lever Sequence, Starter Interlock & Transmission Braking Effect
- FMVSS 103 Windshield Defrosting & Defogging Systems FMVSS 104 Windshield Wiping & Washing Systems FMVSS 105 Hydraulic & Electric Brake Systems
- FMVSS 106 Brake Hoses
- FMVSS 108 Lamps, Reflective Devices, & Associated Equipment FMVSS 111 Rearview Mirrors
- FMVSS 113 Hood Latch Systems FMVSS 116 Motor Vehicle Brake Fluids FMVSS 119 New Pneumatic Tires
- FMVSS 120 Tire Selection & Rims for Vehicles Other Than Passenger cars FMVSS 121 Air Brake Systems
- FMVSS 124 Accelerator Control Systems
- FMVSS 201 Occupant Protection in Interior Impacts FMVSS 205 Glazing Materials
- FMVSS 206 Door Locks & Door Retention Components
- FMVSS 207 Seating Systems
- FMVSS 208 Occupant Crash Protection FMVSS 209 Seat Belt Assemblies
- FMVSS 210 Seat Belt Assembly Anchorages FMVSS 302 Flammability of Interior Materials

In accordance with SAE ARP5539, the carrier vehicle shall be type “a.”, Truck Type Vehicle. Truck type vehicles are standard production models designed primarily to meet an airport's snow and ice control needs. The vehicle shall be self-contained, designed specifically for a singular purpose. They should conform to the manufacturer's recommendations and be suitable for mounting all specified accessories.

4.6.1 Materials

Materials used on a carrier vehicle shall conform to the specifications listed in the appropriate sections of Title 49, Chapter III Federal Motor Carrier Safety Regulations. When not specifically listed, materials shall be of the best quality available for their intended commercial use. Component parts shall be new, unused, of current production to the satisfaction of the purchaser. They shall be free of all defects and imperfections that could affect the serviceability of the finished product.

4.6.2 Design

Equipment shall be developed in accordance with the best engineering practices available. This includes the incorporation of ergonomic designs specifically directed at the vehicle's cab environment. Vehicle design shall include current state-of-the-art procedures that consider improved cab visibility, communications systems, interior lighting and the mitigation of noise and vibration. Design and installation of equipment shall permit easy accessibility for maintenance and service. All vehicle stress points shall be designed to distribute and dissipate shock forces.

4.6.3 Construction

Vehicle construction shall provide maximum protection against structural member failures. Equipment shall withstand the cold, moisture, strains, jars, vibration, and other conditions that are likely to be encountered during operation. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks, or other elements that might cause injury to personnel or damage to equipment. Location of all oil, hydraulic, and air lines and electrical wiring shall be in protected positions properly attached to the frame or body structure. Wherever these lines pass through apertures they shall be protected with looms or grommets except where a through-frame connector is necessary.

4.7 Chassis

The design of the vehicle chassis shall be based on an all-wheel drive concept for optimized performance and safety. It shall have power assisted steering and a transmission with suitable load and speed ranges to accommodate normal operating conditions. Vehicles shall have heavy duty tow hooks, tow eyes, or other suitable tow connections attached to the rear of the vehicle. The tow hooks, eyes, or other suitable tow connections shall be attached to the frame or structure of the vehicle, and provide adequate strength to allow lifting and/or pulling the vehicle for emergency recovery situations. A pintle hook, rated at not less than the GVWR shall be permanently attached to the rear frame structure capable of towing a vehicle. All installed parts and accessories necessary for the safe operation of the vehicle shall conform to applicable provisions of Title 49.

4.7.1 Structural Members

The frame shall be made of either pressed or structural steel shape and reinforced as required to prevent distortion under maximum load conditions. All frames and stiffeners shall be treated with a corrosion inhibitor and shall be primed and painted before assembly.

4.7.2 Dimensions and Clearances

Carrier vehicles with snow removal attachments shall have the following overall dimensions:

- a. Minimum Ground Clearance: The minimum ground clearance of a vehicle chassis shall be 8 inches.
- b. Maximum Overall Height: The maximum overall height of a vehicle including discharge chutes, lights, and exhaust stacks shall not exceed 12 feet.
- c. Maximum Overall Width: The overall width of a vehicle including rotary plow head shall be maximum 102" to take into consideration gates and doors to equipment shops at the airport.
- d. Maximum Overall Length: Maximum vehicular length 415 inches taking into consideration shop areas and maneuverability expected of the vehicle during operation.

4.7.3 Weight Distribution

The gross vehicle weight of the vehicle shall be distributed over its axles in accordance with best engineering practices. The center of gravity shall be kept as low as possible under maximum load conditions. While it is loaded the vehicle shall be capable of resting on a 20% transverse grade without danger of overturning. A copy of the calculated weight distribution shall be provided to the customer prior to construction, and the produced vehicle shall not deviate from the calculated weight distribution by more than 5% on any axle, or for the gross weight as determined by weighing the unit at a public certified scale.

4.8 Engine

Engine and vehicle manufacturers shall provide an application approval, at the time of vehicle delivery that states the engine is suitable for use in the vehicle as configured and that the

installation is approved by the engine manufacturer. The vehicle engine shall be of diesel internal combustion type. The diesel engine shall be designed and tuned for operation using ASTM D 2 diesel fuel. Anti-freeze, crankcase and gear oils, greases, automatic transmission fluid, and hydraulic oils shall be as per current SAE, API, or ASTM specifications and not proprietary products. It shall be able to meet the performance characteristics specified herein on commercial grade fuel. Dual engine vehicles shall use a common fuel. The engine shall develop sufficient torque and horsepower to meet its normal operational requirements without exceeding the no-load speed at the peak of its certified gross brake horsepower curve. Engine noise and vibration shall be reduced in the vehicle cab by use of best engineering practices and machine layout. Idle time limiters or other automatic shutdown devices designed to limit emissions, conserve fuel, or enhance operating costs must be permanently disabled if such devices could leave a unit disabled on a taxiway or runway. Permanently disabled means the disabling must be done in such a manner so as not to be easily or accidentally re-activated.

4.8.1 Cooling System

The engine cooling system shall be based on either a liquid air design. Internal temperature shall be controlled by a by-pass thermostat that regulates the flow of engine coolant. Drain cocks shall be installed at the lowest point of the cooling system and at other points necessary to completely drain the system. A sight glass or other device is required in all liquid cooling systems to allow the operator to determine that there is sufficient fluid for normal and safe operation without the need to open the system.

4.8.2 Coolant Temperatures

The design and installation of the system shall assure that coolant temperatures shall remain within the engine manufacturer's operational specification (both high and low) when properly maintained and operated in ambient temperatures during snow removal operations. In areas which frequently experience temperatures below 20°, cooling system heaters, oil pan heaters, lubricating oil heaters, battery and block heaters, and cold start aides required unless otherwise specified.

4.8.3 Fuel System

The fuel system shall comply with Title 49 and include all components necessary for a complete operational system.

4.8.4 Fuel Tanks and Lines

Useable fuel capacity should be not less than 250 gallons. If dual tanks are used, the supply system shall be designed to ensure an uninterrupted flow of fuel to the engines without input by the operator, and to allow shutoff of each tank should the crossover lines of either tank be damaged. Dual tanks shall also have adequately sized crossover lines to allow refilling both tanks from one location. Fuel lines shall be securely fastened in place, installed to prevent chafing or strain and protected by grommets where lines project through metal apertures. Each fuel tank is to be equipped with an accessible bronze or brass drain plug or a quick drain. A properly rated fuel water separator with integral heater shall be installed in an accessible location near the tank.

4.8.5 Fuel Filler Pipe

The fuel filler pipes shall be located outside of the vehicle cab in an area accessible for refueling from the ground. A light chain shall be attached near its opening and to the filler cap to prevent loss of the cap. The filler neck shall include a screen to prevent the entry of foreign objects into

the tank. The fuel filler cap shall be painted a color appropriate for the type of fuel, and a permanent label shall be affixed as close as practical to the fill necks, in an area visible to the person refueling the vehicle, stating the appropriate fuel and capacity of the tanks. A label shall also be installed in the cab near the fuel gauge indicating which side of the vehicle must be positioned towards the fuel pumps (e.g., Fuel Fill).

4.8.6 Air Cleaner

The air cleaner shall be of a two-stage design. The first stage incorporates a pre-cleaner while the second consists of a dry type replaceable paper filter. A restriction indicator is required in the cab for each engine air intake system. The connection between the air cleaner outlet(s) and the engine intake(s) shall be waterproof and dust tight. The air cleaner intake shall be positioned in a manner to discourage the ingestion of snow and other contaminants, e.g. within the hood cavity.

4.8.7 Exhaust System and Muffler

The engine shall be equipped with an efficient and safe exhaust system including mufflers. Its location shall minimize noise and exhaust gases entering the vehicle cab under all operating conditions. Further noise reduction by noise suppression materials, such as muffler insulation, is encouraged. Horizontal portions of exhaust systems shall be protected, whenever possible, from corrosive agents and fuel spills. Mufflers and exhaust components positioned in or near normal operator work areas shall include appropriate guards to minimize the burn risk to airport personnel. Exhaust systems shall be positioned on the vehicle in a manner to minimize contact with slush and snow. Mufflers are to be made of stainless steel. Devices shall be installed to prevent snow and slush from entering vertical exhaust stacks. The exhaust shall be on the left rear of the vehicle.

4.8.8 Governor

Engine speed shall be regulated by a governor set to provide the maximum operating speed recommended by the engine, driveline, and power train manufacturers.

4.8.9 Lubrication

An engine's lubricating system shall be equipped with standard production fittings and accessories. Engine oil filters shall be engine manufacturers approved design and able to accept commercial replacement elements. All engines shall receive lubrication prior to delivery with lubricants designated for use under ambient temperature conditions at the point of delivery. The unit shall have a comprehensive lubrication placard affixed on the exterior to identify the proper lubricants and their temperature ranges.

One (1) complete set of spare filters for all systems shall be provided with vehicle

4.8.10 Engine protection

An automatic engine protection system to prevent engine damage due to low engine pressure, high coolant temperature, or low coolant level is required. A provision for the emergency movement of the unit from a runway or taxiway must be provided.

4.8.1 Accessibility

a. Component Location

Engine and chassis components shall be positioned to allow easy access for inspection and maintenance purposes. Components that historically present maintenance problems or those that have the potential to cause operational problems should particularly be located in unobstructed areas. Locks, controls and fasteners shall be designed to prevent

over-torquing. Fluid capacities that must be checked during a pre-trip inspection, such as hydraulic oil level(s), windshield washer fluid level, and diesel fuel level shall be visually observable or otherwise capable of being checked without the need for tools, and without requiring work stands, portable ladders, or other equipment to check the service levels. To the extent practical lighting in these areas shall be adequate to perform the checks without the need for flashlights or other portable lighting.

b. Cover Plates

Cover plates shall be equipped with either quick-disconnect fastenings or hinges.

4.9 Drive Train

4.9.1 Transmission

Automatic transmission and vehicle manufacturers shall provide an application approval with their proposal that states the transmission is suitable for use in the vehicle as configured and that the installation is approved by the transmission manufacturer. The transmission shall operate smoothly and efficiently and be capable of transmitting the maximum gross torque generated by the engine to the drive wheels through all gear reductions. Safety interlocks to prevent starting the engine unless the transmission is in neutral, or, the clutch is disengaged, shall be installed. Drive trains shall be in conformance with SAE requirements and shall be designed to minimize the number of joints.

- a. The automatic transmission shall be fully automatic with a transfer case. The design shall utilize a torque converter that shall have a suitable torque ratio for the expected load ranges. The torque converter shall not operate at less than 70% efficiency. The gear or range selector shall have forward, neutral and reverse positions clearly identified.

4.9.2 Transfer Case

The vehicle and transfer case manufacturers shall provide an application approval with the proposal that states the transfer case is suitable for use in the vehicle, as configured. Transfer case assemblies shall provide positive drive to the front and rear axle and in accordance with SAE ARP 5539, must be multi-speed design. Three proven alternatives are the manual front axle dis-connect type, the center differential with manual or automatic lockout type, or an overriding clutch type. The purchaser shall specify the type of transfer case that is acceptable, therefore the type chosen is the automatic lockout type. Further, the transfer case shall be a separate unit mounted independently and not integrated with the transmission.

4.9.3 Axles

The axle and vehicle manufacturers shall provide an application approval with the proposal that states the front and rear axles are suitable for use in the vehicle, as configured. The axle manufacturer's published rating shall at the least be equal to the load imposed at ground level when the vehicle and/or each component is in its maximum load configuration (i.e., rotary plow up and rotary plow down). Manual lockout controls shall be located in the vehicle cab. The torque capacity of each axle and differential shall be at least 10% in excess of the maximum torque that the axle may experience under any GVW operating condition. The power transmitting shaft on each steering axle shall incorporate steering joints that do not produce objectionable steering characteristics while the vehicle is operating on uneven surfaces. In accordance with the SAE ARP5539, of the two proven designs available the airport chooses single reduction axles with all gear reduction taking place in the central housing of the axle.

4.10 Brake System

Vehicle service and emergency braking systems shall meet Title 49 requirements for vehicles of similar design. The brake system shall be air design and shall be complete with all necessary equipment to safely control, stop and hold a fully equipped vehicle under all normal operating conditions. In accordance with SAE ARP5539, antilock brakes are specified for improved safety on the airport operational areas.

4.11 Steering Mechanism

The vehicle shall have a steering mechanism that is operated from the driver's seat. During normal operations, the mechanism shall be capable of controlling the vehicle with all equipment operating. Steering equipped with power assistance shall revert to manual operation in the event of power assist system failure, or be equipped with a dual power steering system that operates in a fail-safe manner so that the failure of one system will not lead to a loss of steering. The design of the steering mechanism should, in the event of a power assist failure, be capable of safely maneuvering the vehicle off the primary operational areas of the airport and to a park position from the maximum design speed allowed on the airport. The purchaser requires and specifies all wheel steer with front wheel steer, rear steer, crab steer, coordinated steer.

4.12 Suspension System

Vehicles shall be equipped with a current production model suspension system having a minimum rated capacity equal to the GVW of the carrier vehicle. Front and rear axles shall have auxiliary suspension springs. Manufacturer's capacity ratings may not be arbitrarily raised to conform to the requirements of this specification. The suspension system shall exhibit no permanent set after the load is removed.

4.13 Wheels, Rims, Tires, and Tubes

- a. Wheels, rim and tire ratings shall conform to The Tire and Rim Association's published recommendations.
- b. Tires. Each tire shall have a rated carrying capacity at least equal to the loads imposed on them in the maximum load configuration (i.e., rotary plow up and rotary plow down). Tires on each individual axle shall be of the same size. Tires between axles may vary due to loads, configurations, and engineered gearing sets. In such cases, care must be taken and all components must be viewed as a system that provides an acceptable speed match between driven axles. Tires shall have an aggressive tire tread. Tires shall meet the first line commercial grade requirements for the speed and type of service required. The front and rear tread widths shall not vary by more than 4%.
- c. Spare Rim/Tire. The airport sponsor requires two spare tires and rim assemblies.

4.14 Hydraulic System

The hydraulic system shall consist of appropriate rams, pumps, piping, fittings, valves, controls, fluid reservoirs, filters, coolers, and other parts essential to its full operation. The system shall be capable of hydraulically positioning equipment through the entire range of its design limits. It shall be capable of operating all controls simultaneously without a noticeable reduction in power response. All controls shall be located in the vehicle cab. The system shall be ruggedly constructed and able to withstand all loads imposed on it without relying on the use of mechanical locks. Adequate cooling must be included to maintain acceptable hydraulic oil temperatures throughout expected vehicle operational ranges. Filters within the hydraulic system shall conform to SAE J931.

4.14.1 Pumps and Power Takeoff

The pumps shall be ruggedly constructed and powered by the engine through a power takeoff. It shall have sufficient capacity to operate the hydraulic equipment specified herein under all operating conditions and speeds.

4.14.2 Lines and Fittings

Only commercial quality hydraulic lines, hoses, and fittings that are capable of withstanding system working pressures under load are acceptable. Hydraulic hoses shall have a bursting pressure of three times their rated working pressure. The use of fittings, joints, and connections shall be kept to a minimum. Where local climatic conditions require, the purchaser should consider requiring arctic type hoses with temperature ratings appropriate for the location. Test gauge connection fittings shall be provided at all suitable points throughout system for maintenance and trouble-shooting. All hydraulic system components are to be shielded from engine exhaust heat, and heat shields shall be installed on the engine exhaust system to divert any possible leakage from the hydraulic system. Hoses shall be installed inside steel tubing wherever necessary to deflect the flow of fluid from exhaust and electrical system components in the event of hose rupture or leakage.

4.14.3 Fluid Tank

The hydraulic fluid tank shall have a filler neck consisting of a strainer, drain plug, shutoff valve, air vent and baffles. Its capacity shall exceed the volume of oil required for the operation of any combination of attachments by 50%. A sight glass or other device shall be provided to allow the operator to verify that fluid level is sufficient for safe operation without the necessity of opening the system. An oil level warning device shall be provided in the cab for all hydraulic systems. A label shall be installed as close as practical to the filler neck indicating the proper fluid for servicing the hydraulic system, and the capacity of the tank.

- One set of spare filters shall be supplied with vehicle.

4.14.4 System Winterization

Hydraulic systems shall be designed and operated in accordance with the requirements specified in ARP1247. The hydraulic system shall meet the same low temperature requirements as the engine coolant system. Where appropriate, properly sized shutoff valves shall be installed on each side of all filters to facilitate filter changing with minimal fluid loss. If filters are installed in compartments or other areas where fluid collection is possible, drain holes will be installed to allow fluid drainage during servicing.

Electrical System

The electrical system shall be negatively grounded and installed in accordance with current state-of-the-art practices and appropriate Federal requirements. All vehicle wiring shall be in accordance with SAE J 1292. All vehicle body electrical equipment, components, and wiring shall meet the requirements set forth in ARP1247. All parts of the electrical system shall be waterproof, easily accessible, securely mounted, and protected against extreme temperatures, physical damage, snow, oil, and corrosion. All electrical circuit wiring shall be made of stranded conductors with a capacity exceeding the anticipated maximum circuit loading. Insulation of electrical wiring shall be equal to the recommended standards established for insulation materials by the Society of

Automotive Engineers (SAE). All electrical circuit wires shall be identified by color or number along their entire length. The wiring codes shall match information to be provided in the supporting service manuals.

4.15.1 All vehicle components and systems shall operate without being affected by interference damage or disruption including detrimental effects or interference to on-board computer modules from either vehicle generated noise, or stray EMF or RMF fields encountered from any airport operations. EMF and RMF noise sources that may be generated by the vehicle, especially if such noise is detrimental to aircraft, Air Traffic Control, or air navigation equipment, shall be shielded.

4.15.2 Power Supply

The carrier vehicle shall be equipped with self-regulating electric alternators having an output capacity that exceeds the anticipated electrical load. The minimum idle output of the alternator shall be 20% greater than that required by the vehicle with the engine operating at idle, heater and defroster set at low fan setting, parking and/or marker lights on, communication radio(s) on, windshield wipers operating, and either hazard flashers or Vehicle Safety Identification Lights on. The minimum output of the alternator when operating at governed engine speed shall be 20% greater than that required by the vehicle in its operating mode with the heater and defroster set to maximum settings, headlights and marker/tail lights on, communication radio(s) on, windshield wipers at maximum setting, and the Vehicle Safety Identification Lights operating. An electrical load analysis worksheet shall be provided to the customer prior to construction showing the electrical loads during the above described conditions.

4.15.3 Batteries shall be securely mounted and adequately protected against physical injury, water, chemicals and exhaust heat. They shall be properly sized based on vehicle manufacturer recommendations and be readily accessible for change out and for other purposes. Enclosed battery compartments shall have adequate ventilation. Battery capacity (cranking amps, voltage, reserve power, continuous/deep cycle demand) shall be compatible with the size of the engine and the anticipated electrical load expected under normal operating conditions. An on-board self-regulating battery charger shall be installed.

4.15.4 Starting Device

The vehicle shall have a 12 volt electrical starter that shall not introduce a voltage drop sufficient to adversely affect the ignition system. It shall be equipped with an overload protection device if such device is available from the manufacturer of the starter

4.15.5 Ignition System

A high idle control for efficient engine warm up and stand by operations shall be provided. High idle switches or throttle controls shall be designed to operate only when the transmission is in neutral.

4.15.6 Backup Alarm

The vehicle shall be equipped with a backup alarm installed at the rear. The backup alarm shall be activated whenever the transmission is placed in reverse. The backup alarm shall be a SAE J994, Type B vehicle backup alarm.

4.15.7 Horn

The vehicle shall be equipped with an electric horn to allow the operator to provide an audible warning in an emergency.

4.16 Lighting System

The lighting system, including reflectors, markers identification and clearance lights, shall conform to FMVSS 108 as though the vehicle were an on-highway vehicle. Task-oriented lights shall be furnished to help the operator identify the overall width and to project a light pattern on the ground in front of the blower to assist the operator in determining those areas to be cleared and to provide adequate illumination for the operator and service personal when the unit is on darkened aeronautical areas. ALL lighting shall be LED where allowed by FMVSS.

a. **Headlights**

The carrier vehicle shall be equipped with two or more sealed-beam quartz-halogen headlights with upper and lower driving beams and switch for beam selection. If snow removal attachments obstruct forward illumination of these lights an auxiliary set of comparable lights shall be provided to overcome the obstruction. A control to select the secondary lights shall be provided in the operator cab.

b. **Backup Lights**

There shall be at least two backup lights installed at the rear of and at either side of the vehicle that will automatically be activated when the vehicle is shifted into reverse gear.

c. **Vehicle Safety Identification Lights**

The vehicle shall have a minimum of two amber LED rotating beacon lights. One installed on top the operators cab and one at the furthest practical location at the rear of the vehicle (see FAA AC 150/5210-5D, Painting, Marking and Lighting of Vehicles on an Airport). The light emitted from the beacon should not reflect off rearview mirrors and into the operator's eyes.

4.17 Operator's Cab

4.17.1 General

Carrier vehicle cabs shall be made of metal and fiberglass construction and be a cab forward design. They shall be fully enclosed accommodating a single operator plus assistant trainee. A definite separation shall exist between the engine and operator's compartment. Non-glass surfaces, such as the floor, sides, and roof of the cab, shall have insulation to reduce exterior noise. The maximum interior cab noise measured at the operator's seat shall not exceed 85dBa under the following conditions: windows closed, heater and defrost systems at maximum operation, and carrier vehicle and equipment engines operating at maximum rated capacity. To the extent possible, the interior of the cab shall be ergonomically designed providing the operator with a pleasant working atmosphere that is devoid of the stark conditions normally associated with older equipment. All cabs shall provide at least two different routes of egress to allow the operator to exit the cab in the event of rollover or over-turn.

4.17.2 Communications Equipment Space

Transceivers shall be installed in carrier vehicles to establish voice communication with other vehicles, the air traffic control tower, and snow control center and maintenance facilities. The vehicle cab shall be designed to provide convenient space near the operator for the installation of three (3) transceivers. Two (2) Icom A120 aviation radios and one (1) Motorola XTL 1500 mobile radio shall be installed in the operator cab in close proximity to the operator. A Fire Com wireless headset system equipped with one (1) headset for the operator shall be provided and installed in the vehicle cab. The headset shall be configured to receive the Icom transceivers in one ear and the Motorola transceiver in the other. A push-to-talk button shall be supplied on the wireless headset. A control box shall be provided to allow the user to select the radio to transmit via the headset.

4.17.3 Fire Extinguisher

The vehicle cab shall have one 20lb (20 BC) Purple K type fire extinguisher installed within the cab.

4.17.4 Operator Seat

The vehicle cab shall provide an operator seat that can easily be adjusted up and down, fore and aft, a minimum of 3 inches (7.6 cm) in each direction. The seat should also be capable of reducing the effect of vehicle vibration by featuring air-cushion shock absorbing seat systems. All vehicle seats shall have three-point (minimum) seat belts, certified by the vehicle manufacturer to have been tested and in conformance with FMVSS requirements. Seats shall be fully upholstered with a good quality fabric material.

4.17.5 Windows and Windshield

An electrically heated windshield shall be provided. The vehicle cab shall maximize the use of glass, including the placement of panels if possible in the lower sections of door panels, to increase the operator's view of operational areas and ground surfaces. All installed glass shall be laminated and safety rated and shall conform to all FMVSS requirements. The location and size of the windshield shall minimize visual obstructions to the operator. The windshield shall be reverse slope design to avoid snow build up and be equipped with four variable speed intermittent operating wipers, wet arm type. The windshield wiper system shall be capable of sweeping a clear view for all occupants. The windshield washer reservoir shall have a capacity of at least 10 gallons. Fluid applicators shall be located to provide at least 75% coverage of the windshield. The cab shall be equipped with sun visors inside the cab and an exterior visor above the windshield. Windshields and other glass surfaces in the vehicle cab used in the operation of the vehicle and/or to view pavement surfaces shall be cleared by means of a defroster system that is part of the cab's heating system. The standard circulating air type defroster shall be complimented by two electrical auxiliary fans.

4.17.6 Exterior/Rearview Mirrors

Two electrically heated exterior rear view mirrors of the extension arm type shall be mounted one on each side of the vehicle cab. Rear view mirrors are to be powered and remotely controlled. Each mirror shall have an area of not less than 100 square inches.

4.17.7 Heater

The carrier vehicle cab shall have a heating system that is capable of maintaining a minimum interior temperature of 65 °F (18 °C) at an ambient outside temperature of -20 °F (-29 °C). Heat output shall be controllable from within the cab by a selector switch that is conveniently located to the operator. Under all conditions of heating and ventilation, the temperatures measured in the operator's immediate environment should be uniform within 9 °F (see SAE J1503). Cab air conditioning is required per SAE 5539 / Appendix B.

4.17.8 Ventilation

Ventilator/heater fan shall have blower capacity equal to one cab volume per minute. Cab ventilator intakes should be screened and positioned in such a manner to minimize the entry of snow.

4.17.9 Hour Meters

The carrier vehicle shall be equipped with an hour meter that registers engine operation time from 0 to 9999 hours. Hour meters shall be prominently displayed so that they can be easily read by an operator or service personnel.

4.17.10 Instrumentation

The cab shall display an instrument panel equipped with rocker switches and controls and instruments that are friendly to operators wearing bulky winter clothing. Frequently used instruments shall be located in direct line-of-sight and within forearm reach of a medium sized person sitting in the operator's position. All instruments shall be clearly identified with labels that indicate their function. Instruments should display urgency-of-action lights, i.e., green for normal operation, amber for warning, and red for emergency. Instruments shall be illuminated by background lighting regulated by dimmer switches capable of providing infinitely variable lighting intensities. Circuit breakers shall be grouped for easy access and convenience. Typical instruments that report and track major functions of a carrier vehicle and mounted equipment are as follows:

- a. Engine:
 - 1) Voltmeter
 - 2) Lubricating Oil Pressure Gauge
 - 3) Coolant Temperature Gauge
 - 4) Tachometers
 - 5) Hour meters
 - 6) Starting Controls (including auxiliary cold start controls)
 - 7) Hydraulic Oil Pressure and Temperature Gauge if applicable
 - 8) Transmission
- b. Vehicle Chassis:
 - 1) Brake -air Pressure Gauges
 - 2) Low-air Pressure Warning, visual and audible type
 - 3) Light Switches and Headlight Beam Indicator
 - 4) Speedometer with Recording Odometer
 - 5) Fuel Quantity Gauge
 - 6) Equipment Controls

4.18 Sheet Metal Components

4.18.1 General

The carrier vehicle engine, as well as its mechanical components, shall be protected wherever possible from snow, rain and other winter elements. Body and engine enclosures shall be fabricated fiberglass. Self-tapping bolts are unacceptable in the construction of these enclosures.

- a. Steps

Four-way safety tread, open design steps are required to ascend and descend high profile carrier vehicles. These steps, together with assist handles, shall provide for constant three-point contact, and shall be of ample size to ensure safe and easy access for persons wearing bulky winter clothing.
- b. Walkway

A four-way safety tread, open design walkway shall be provided, as necessary, for access. Walkways shall be external so a technician may to walk on them standing full height.

- c. Handrails
Handrails shall be provided as required at all steps, walkways, and work stations. They shall be made of corrosion-resistant materials or otherwise treated to prevent corrosion.
- d. Fenders
All carrier vehicles shall be equipped with steel fenders mud flaps to prevent wheels from throwing snow and other debris.
- e. Drains
Plugged or free flowing drains shall be provided at all body and compartment locations where standing water can collect. Free flowing drains shall not drain onto sensitive mechanical or electrical components or on areas anticipated to be occupied by personnel during normal operations.
- f. Doors
Doors shall be equipped with a positive closing mechanism and a locking mechanism. Doors shall have straps so as to not fly past limits in wind.
- g. Gutters
The vehicle cab shall be equipped with gutters, located above the entrance doors, of sufficient length to span the door width and provide runoff protection to occupants either entering or exiting the cab.

4.19 Painting, Marking, and Lighting of Vehicles

4.19.1 Painting and Marking

The vehicle shall be painted Chrome-Yellow in accordance with color tolerance charts that have been made available for FAA regional airport inspectors and key potential users in the aviation safety equipment industry (see AC 150/5210-5D).

4.19.2 Preparation and Finish

The carrier vehicle and all mounted and towed equipment shall be cleaned first, then treated with a corrosion inhibitor, primed, puttied, sanded, and finally painted. The paint shall consist of not less than two coats of Chrome-Yellow polyurethane enamel, acrylic enamel, acrylic urethane, or similar high durability, long life paint as required by the purchaser, applied to produce full hiding.

4.19.3 Quality

The finished paint shall be free of "fisheye," "orange peel," chips, runs, or other imperfections that detract from the equipment's corrosion resistance and appearance.

4.20 Miscellaneous

4.20.1 Plastic Plates

Plastic plates are acceptable only in locations that are not exposed to the elements and subject to weathering or excessive heat.

4.20.2 Information

Plates shall identify make, model, serial number, and any other relevant data.

4.20.3 Technical Publications

The manufacturer shall furnish two complete sets of manuals. One set of manuals shall consist of an Operator's manual, Parts Manual, and Maintenance and Service Manual. All of the as-built manuals shall also be available on the manufacturer's website, pass word protected for the airport's qualified personnel.

4.20.4 Operator's Manual

The operator's manual includes lubrication charts and instructions.

4.20.5 Parts Manual

The parts manual identifies and lists all parts, components, and sub- assemblies used in the fabrication of the carrier vehicle and mounted equipment.

4.20.6 Maintenance and Service Manual

A maintenance and service manual provides guidance to non-specialists performing routine services. The manual should also describe in detail with appropriate schematics the overhaul and major maintenance procedures required to maintain and repair the vehicle. The maintenance manuals shall include complete schematics of the electrical, air, and hydraulic systems as applicable. Number codes on wires and hoses as found on the vehicle shall match those provided in the maintenance manual schematics.

All manuals and publications pertaining to this vehicle and all components may be in the form of a DVD or flash drive.

4.20.7 Accessories and Tools

The carrier vehicle shall be equipped specialized items as follows.

4.20.8 Lug wrench and any other special tire tools required to change a flat tire.

4.20.9 Jack

A pneumatic jack specifically adapted to the carrier vehicle and of adequate capacity to be capable of raising it to a position where a flat tire can be changed. An air connection shall be provided and equipped with the appropriate inlet to use with the pneumatic jack.

4.20.10 Shear Pins

A minimum of six sets of shear pins shall be provided.

SAE ARP5564 Airport Runway Brooms Section 4

In accordance with SAE ARP5564, Airport Runway Brooms Section 4.

4. Runway broom uses

Airport runway brooms are primarily used to clean snow, slush, and ice from airport runway, taxiways, and ramp areas by using a brush with bristles to clean the surfaces.

5. Runway broom configurations

Front mount type which clears snow before passing wheels or plow blades have a chance to compact and push the snow into the grooves and pores of the pavement.

5.3 Front Mount Multi-Purpose

Multi-Purpose configuration for fast changeover shall be supplied. This type has the ability to accept a rotary plow specified herein in place of the broom making the unit capable of sweeping or snow blowing, not simultaneously.

SAE ARP5564 Airport Runway Brooms; TECHNICAL REQUIREMENTS I GENERAL SPECIFICATIONS

In accordance with SAE ARP5564, Airport Runway Brooms;

TECHNICAL REQUIREMENTS I GENERAL SPECIFICATIONS

The intent is to provide detailed specifications for procuring a runway broom. Based on local conditions and needs the user is herein specifying the parameters required. In accordance with SAE ARP5564, other considerations such as local conditions, maintenance, and commonality of fleet, product support, and advances in technology are used to develop this detailed specification.

6.1 General Description

This airport runway broom will be primarily used in the sweeping and cleaning of snow slush and ice from airport runway, taxiway, and ramp areas. The broom shall be manufactured expressly for airport pavement sweeping. All items of design and equipment not listed in these specifications, but involved in carrying out their intent, are required to be furnished the same as if these items were specifically mentioned and described in these specifications.

Components shall be new, unused, of current production to the satisfaction of the airport purchaser. They shall be free of all defects and imperfections that could affect the serviceability of the finished product. Components should be readily accessible for repair and replacement, with minimal removal or disturbance to adjacent parts or components. Designs must use components within their rated values. Parts which are exposed to wear shall be capable of being replaced. Regular maintenance and servicing should be readily accomplished under normal working conditions.

All broom components shall be designed to provide continuous service under difficult working conditions in -20 degrees F to +100 degrees F weather conditions or as specified without degradation of performance. The broom shall be designed to allow bristles to be easily replaced once worn or damaged. When mounted on a carrier vehicle, no components of the broom shall interfere with the servicing and maintenance of the carrier vehicle.

The broom shall have the ability to remove snow, ice, slush, sand and other debris at the rated speed, capacity, and conditions per the following;

The broom must be able to move 3 inches of snow at 15 pounds per cubic foot at the rated vehicle speed and full swept path. The broom must be able to move 1 inch of snow at 40 pounds per cubic foot at the rated vehicle speed and full swept path.

Additional broom requirements

Technical Specifications

PUR-1355

**Snow Removal Equipment – One (1) New Multi-Purpose
Airport Rotary Plow & Runway Broom With Carrier Vehicle**

AIP-3-24-0019-XXX-2017

MAA-GR-XXX-2017

TS-21

- Broom configuration: Front Mounted Multi-purpose
- Required speed of operation (MPH): 30 mph
- Brush swept path (feet): 16.4 feet
- Snow moving capacity (tons per hour): 4752
- Surface area swept rate (square feet per hour): 2 027, 520
- Broom power supply horsepower (horsepower): 575
- Brush diameter (inches) : 46
- Brush rotation speed (0-RPM): 400
- Brush available torque (foot-pounds): 3300
- Air blast capacities (CFM @ MPH): 23,000 CFM @ 400 mph
- Bristle type and configuration: 50 poly / 50 wire combination

To confirm the brush rotational speed and available torque values, the manufacture must supply engineering hydraulic power calculations of the brush drive train from the engine or power supply to the brush shaft. This includes sizes and specifications of all components of the brush drive train from the engine to the brush shaft including specification sheets for the broom engine, brush and air blast hydrostatic pumps, motors, and gearbox(s) showing type, size, and manufacture. Efficiency losses must also be accounted for. The calculations must be understandable, complete, logical, and in a mathematical order per the Society of Automotive Engineers (SAE) and the Fluid Power Society standard formulas .and practices. The burdened of proof is the responsibility of manufacturer. Failure to provide this information for whatever reason will result in disqualification

6.2 Broom Chassis Platform

See carrier vehicle specification contained herein.

6.3 Broom Engine Assembly (or Power Supply)

The broom engine manufacturer and broom manufacturer shall provide an application approval, at the time of sweeper delivery, which states the engine is suitable for use in the broom as configured and that the installation is approved by the engine manufacturer. The engine shall develop sufficient torque and horsepower to meet the operational requirements of the broom. It shall be of internal combustion type. It shall meet current (at time of build) federal emissions standards and local requirements as defined by the user. It shall be equipped with electronic controls for fuel injection and engine management including an automatic shutdown system with manual override and an electrical connector for diagnostic system. The diesel engine shall be designed and tuned for operation using ASTM D975-93 Standard Specifications for Diesel Fuel Oils, unless otherwise specified by the user, at the performance characteristics specified herein. Engine noise and vibration shall be minimized for the operator by use of best engineering practices and machine layout. The brush and air blast must be designed to efficiently utilize the rated engine horsepower.

The engine shall be provided with a full-flow replaceable oil filter and bypass filter and an air intake with a three-stage air cleaner. A filter restrictor indicator with tattletale features shall be supplied.

The engine shall be equipped with an efficient and safe exhaust system including mufflers. Its location shall minimize noise and exhaust gases entering the vehicle cab under all operating

conditions. Noise reduction by noise suppressor materials, such as muffler insulation, is encouraged. Horizontal portions of exhaust systems shall be protected, whenever possible, from corrosive agents and fuel spills. Mufflers and exhaust components positioned in or near normal operator work areas shall include appropriate guards to minimize the burn risk to airport personnel. Exhaust systems shall be positioned on the vehicle in a manner to minimize contact with slush and snow. Muffler(s) are to be made of aluminum, aluminized steel, stainless steel, or materials coated with ceramics. Devices shall be installed to prevent snow and slush from entering vertical exhaust stacks.

The engine cooling system shall be based on either a liquid or forced air design. Internal temperatures of liquid cooled engines shall be controlled by a by-pass thermostat that regulates the flow of engine coolant. Drain cocks shall be installed at the lowest point of the cooling system and at other points necessary to completely drain the system. A sight glass or other device is required in all liquid cooling systems to allow the operator to determine that there is sufficient fluid for normal and safe operation without the need to open the system. Coolant shall be per engine manufacture recommendation and approval. A tag or label shall be supplied at the fluid servicing point indication proper coolant.

The design and installation of the system shall assure that coolant temperatures shall remain within the engine manufacturer's operational specification (both high and low) when properly maintained and operated in ambient temperatures during snow removal operations. In areas which frequently experience temperatures below 0 degrees F and/or units stored outside, cooling system heaters, oil pan heaters, lubricating oil heaters, battery heaters, and cold start aides are required unless otherwise specified.

Engine speed shall be regulated by a governor set to provide the maximum operating speed recommended by the engine manufacturer.

An engine's lubricating system shall be equipped with standard production fittings and accessories. Engine oil filter(s) shall be engine manufacturers approved design and able to accept commercial replacement elements. All engine(s) shall receive lubrication prior to delivery with lubricants designated for use under rated temperature conditions. The unit(s) shall be tagged to identify the proper lubricants and their temperature ranges.

An automatic engine protection system to prevent engine damage due to low engine pressure, high coolant temperature, or low coolant level is required. A provision for the emergency movement of the unit from a runway or taxiway must be provided.

6.4 Fuel System – see carrier vehicle

6.5 Electrical System

See carrier vehicle electrical system requirements.

When required, the broom shall be equipped with self-regulating electric alternators having an output capacity that exceeds the anticipated electrical load by 20% at idle. An electrical load analysis worksheet shall be provided to the purchaser prior to construction showing the electrical loads during the above described conditions.

When required, the batteries shall be securely mounted and adequately protected against physical injury, water, chemicals and exhaust heat. They shall be properly sized based on vehicle

manufacturer recommendations and be readily accessible for change out and for other purposes. Enclosed battery compartments shall have adequate ventilation. Battery capacity (cranking amps, voltage, reserve power, continuous/deep cycle demand) shall be compatible with the size of the engine and the anticipated electrical load expected under normal operating conditions. A battery master disconnect switch shall be provided with a means to secure it in the off position for servicing.

6.6 Sheet Metal Components and Accessibility

The engine and other components shall be positioned to allow easy access for inspection and maintenance purposes. Components that historically require frequent maintenance or those that have the potential to cause operational problems should particularly be located in unobstructed areas. Fluid capacities that must be checked during a pre-trip inspection, such as engine oil, engine coolant, hydraulic oil level(s) , windshield washer fluid level, and diesel fuel level shall be visually observable or otherwise capable of being checked without the need for tools, and without requiring work stands, portable ladders, or other equipment to check the service levels. Lighting in these areas shall be adequate to perform the checks without the need for flashlights or other portable lighting. Cover plates shall be equipped with either quick- disconnect latches or hinges. Locks, controls and latches shall be designed to prevent over-torqueing .

6.6.1 Engine Enclosure

The broom engine, as well as all attached hydraulic, electrical, and mechanical component s, shall be protected wherever practical from snow, rain, chemicals, and other winter elements. Enclosures may be fabricated from fiberglass. Self-tapping bolts are unacceptable in the construction of these enclosures. The enclosure shall be designed with openings which allow adequate cooling air flow to prevent overheating of the engine and other components. Adequate switched lighting shall be included. Drain lines shall be provided for engine oil, radiator coolant and hydraulic oil.

6.6.2 Steps

Steps, stairways, ladders, walkway s, handholds, and handrails used to access the cab, maintenance areas, operation areas, or other areas of the equipment shall conform to the most recent additions of J 185 - Access Systems for Off-Road Machines, using the “preferred” dimensions offered in this standard. Four-way ‘safety tread’ design steps shall be supplied to ascend and descend certain high profile area. These steps, together with assist handles, shall be of ample size to ensure safe and easy access for persons wearing bulky winter clothing.

6.6.3 Walkways

A four-way safety tread design walkway shall be provided, as necessary , for access. The walkways shall be external to the vehicle enclosures and shall allow technicians to stand fully upright while servicing carrier vehicle and auxiliary engines.

6.6.4 Handrails

Handrails shall be provided as required at all steps, walkways, and work stations. They shall be made of corrosion-resistant materials or otherwise treated to prevent corrosion.

6.6.5 Doors

Door openings of adequate size to facilitate equipment servicing shall be provided. Doors shall be equipped with a positive closing mechanism and, where appropriate, a locking mechanism.

6.6.6 Drains

Plugged or free flowing drains shall be provided at all body and compartment locations where standing water can collect. Free flowing drains shall not drain onto sensitive mechanical or electrical components or on areas anticipated to be occupied by personnel during normal operations.

6.7 Broom Hitch

The broom hitch shall be capable of sustaining all loads imposed during operation. It shall provide low friction and free flotation for the brush head for bounce and skip free operation. It shall allow the brush head to be independent so the broom chassis does not induce bounce into the brush. The broom hitch shall have the necessary degrees of freedom to follow normal contours in the pavement and to accommodate surface irregularities, while sweeping at the rated speed, bouncing skipping, binding or sustaining damage. The broom oscillation shall provide true flotation left to right for the brush head. It shall have at least 8 degrees (+4, -4) of free floating oscillation from left to right.

The user requires and specifies herein an interchangeable hitch with quick release hydraulic connections.

6.8 Brush Angle

The brush angling mechanism shall be power actuated and controlled by the operator. The brush shall be capable of swinging at least 30 degrees left and 30 degrees right from the straight ahead position. Angling from full right to full left shall not take more than 10 seconds and shall not change the brush pattern. In between full left and full right, the pattern shall not change more than 50%.

6.9 Brush Elevation and Brush Pattern Adjustment

The brush elevation mechanism shall be power actuated and controlled by the operator using typically a joy stick, which shall raise the brush off the surface and lower it for sweeping. The elevation mechanism shall have adequate stroke to achieve 4 inches of ground clearance with a new brush. The lift cylinders shall be equipped with a counterbalance valve, which prevents the brush head from creeping down.

An easily adjustable and accessible height adjustment that sets the brush pattern shall be provided. The adjustment, when preset, shall act as a stop for the elevation mechanism allowing repeatable pattern adjustment. A toggle switch near the adjustment for remote brush elevation control and pattern confirmation shall also be provided.

6.10 Brush Head

The brush head frame must sustain the loads imposed by the snow removal capacity of the unit. The brush head and air blast shall be hydrostatic drive with infinitely variable speed hydraulic pump(s) and fixed displacement motor(s) or as specified by the user. If gearboxes are used they shall be made with precision gears, AGMA 10 rating minimum, and a method for checking oil level without the use of tools. Hydrostatic motor(s) shall be tightly coupled to the brush core

shaft with no looseness in any connection. The connection must be capable of handling the loads imposed by the hydrostatics.

The brush shall be vibration analyzed at final inspection with report on vibration provided upon request.

The brush head shall allow an easy access for core and I or bristle replacement allowing repeatable location of brush centerline alignment during brush core remove and replace operations.

6.11 Brush Hood

The brush hood shall be fabricated from heavy gauge sheet steel or other durable material and securely fastened to the brush frame. It shall shield the top half of the brush completely and shall be non-clog design to prevent snow and ice buildup underneath the hood. It shall provide the necessary quick access to the brush for replacement of bristles and for inspection.

There shall be a device on the front of the hood to strip the snow from the brush, preventing snow carryover from the front of the brush to the back of the brush. It shall be the full length of the brush. The device must be easily adjustable to the brush diameter as the bristles wear.

The broom must have the capability to control the snow and ice once it is airborne. The snow must be put where and only where the operator desires and the operator must have visibility. The snow control device must be automatic or adjusted by the operator from the operator control station.

6.12 Broom Casters

The weight of the brush head shall be supported by swivel caster tire assemblies. They shall be mounted along the rear of the brush frame. The quantity of tires shall be commensurate with the loading from the brush head. The mounting position must be spaced for uniform weight distribution and shall track within the swept path of the brush. The caster tire assembly shall be capable of revolving a full 360 degrees or 270 degrees if the brush head rises automatically when reversing the vehicle. The caster assembly shall not bind or come into contact with the brush or any other surface of the broom throughout their full rotational arc. Loading and operating speed of the broom shall not overload the caster assembly manufacturer's rating of the entire caster assembly including the tires, wheels, hubs, bearings and shafts. To keep the caster assembly from shimmying, a shimmy damper device is required for each assembly. The mounting of the tire, wheel, hub, shaft and bearings must be quick change type for easy change while on the airfield.

6.13 Brush Bristles

50 poly / 50 wire combination

The bristles for the brush shall be designed for runway operation and shall withstand the normal operation of the broom. They shall be made with adequate retention to keep the bristle from falling out, fatigue strength to keep them from breaking, and wear resistance for acceptable life. The bristles shall withstand storage temperatures ranging from -60 °F to +160 °F and operating temperatures ranging from -40 °F to +125 °F, without functional degradation due to the environment.

6.13.1 Wafers, Flat

The bristles shall be fastened in a radial wafer fashion and shall consist of a steel support ring filled with steel wire bristles or polypropylene (poly) bristles. 50 poly / 50 wire combination. The wafers may be separated by a steel spacer.

Wafer bristle dimensions required:

- Outside diameter: 46 inch, Inside diameter = 19.50 +0.13 -0.00 inches

The support ring for the wafer shall be made of coil steel, minimum thickness 0.048 inch with edge protection to protect bristle from premature wear and breakage. All joints shall be welded to insure structural integrity. Each ring shall have steel drive pins to engage the sweeper core. These pins shall have a minimum diameter of 0.250 inch and 0.63 inches long with 0.50 inches of protrusion from the inside of support ring. One of the drive pins shall be installed at the center of overlap of support ring. The 46 inch wafer shall have not less than 4 drive pins spaced at 90 degrees around the inside circumference .

The wire bristles shall be crimped and made of zinc galvanized drawn steel wire. The bristles shall have a minimum diameter of 0.0165 to 0.0180 inch nominal with minimum tensile strength of 325 000 pounds per square inch (psi). The bristles crimp shall be not less than 3 crimps per inch at amplitude of 1/16 inch minimum. The total weight of the 46 inch wafer shall be 10 pounds minimum.

The poly bristles shall be made from extruded and pulled strands. The material shall be virgin polypropylene with UV inhibitor. Typically the bristles shall have an oval cross section not less than .060 x .090 inch with minimum tensile strength of 4800 pounds per square inch (psi). The total weight of the 46 inch wafer shall be 8 pounds minimum.

The spacer ring which separates the wafer shall be made of coil steel with a minimum thickness of 0.048 inch. Forming the spacer shall create a flat bottom cross section with a welded overlap end seam to create adequate stiffness and strength to withstand the load imposed.

6.14 Brush Cores

The core shall be bearing supported and may be driven from either end, center, or from both ends. Each core shall be individually dynamically balanced by the manufacture at rated RPM. The bristles on the cores shall be full width to the rated length and replaceable. All steel on steel couplings of the drive and core must be replaceable hardened steel.

6.14.1 Wafers

The cores shall be made of tubular steel construction with four hardened steel (163 Brinell hardness minimum) drive bars, equally spaced to center each wafer bristle. The diameter which the four drive bars create must be such that the wafer bristle is easily installed and removed but not to allow movement of the wafer bristle on the core. The diameter of the core must also be industry standard for compatibility of various bristle manufacturers.

6.15 Forced Air Blast

The system shall feature either a double inlet centrifugal blower. The centrifugal impellers shall be hydrostatically driven including a variable displacement pump and fixed displacement motors. It shall be capable of varying its speed allowing blower speed from the operator station.

Air duct(s) shall be installed at the outlet of the impellers. Nozzles shall be attached to these air duct(s). Nozzle ends shall direct the flow to one side or the other. When the brush is angled, the airblower direction shall be capable of automatically following, directing air perpendicular to the direction of travel and toward the direction of broom discharge. The nozzles direction control shall be interlocked with the brush head angle to blow in the direction of broom casting thus controlled by the operators' joystick. A separate control shall allow the nozzle direction opposite of the brush angle by choice. The controls shall permit blowing without broom operation. All controls for the air blast shall be operated from the operator station.

The air ducts shall retract within the width of the vehicle for transport and storage unless otherwise specified. There shall be minimum 8 inches of ground clearance when raised unless otherwise specified.

The impeller I shaft assembly(s) shall be dynamically balanced at the rated RPM. The velocity and CFM at each nozzle shall be certified by an independent test facility and supplied with the bid.

6.16 Hydraulic System

The hydraulic system shall consist of appropriate rams, pumps, piping, fittings, valves, controls, fluid reservoirs, filters, coolers, and other parts essential to its full operation. The system shall be capable of hydraulically positioning equipment through the entire range of its design limits. It shall be capable of operating all controls simultaneously without a detrimental reduction in power response.

All controls shall be located in the vehicle cab. All hydraulic functions of the broom shall be electric over hydraulic valving. Connectors to the solenoids shall be interlocking type to provide a secure connection, which can withstand normal pressure washing procedures. All positioning functions (for example but not limited to: brush head lift, brush head swing, deflector, and air nozzle lift shall be equipped with a position locking system as necessary to prevent unwanted movement. There shall be no hydraulic lines within the operator station.

The system shall be ruggedly constructed and able to withstand all imposed loads. It shall maintain operating temperatures suitable to all system components throughout normal operating conditions. The hydraulic system shall meet the same low temperature requirements as the engine coolant system.

Filters within the hydraulic system shall conform to the Society of Automotive Engineers (SAE) Information Report, SAE J 931- Hydraulic Power Circuit Filtration. Proper filtering shall be done on both the high pressure and low pressure circuits. There shall be a 5-micron absolute rating on the hydrostatic pumps' filters and placed in the charge pressure lines. There shall be a clogged filter indicator light at the operators' station indicating filter replacement. Shut off valves for all filters below tank fluid level shall be installed to allow filter changes with minimal loss of oil.

All hoses for all systems shall be properly sized and strength to work with the pressure and volume of oil required and the appropriate temperature ratings for the climate conditions in which they will be used. Only commercial quality hydraulic lines, hoses, and fittings that are capable of withstanding system working pressures under load are acceptable. Hydraulic hoses shall have a bursting pressure of three times their rated working pressure. The use of fittings,

joints, and connections shall be kept to a minimum. Where required, hoses should be equipped with quick couplers as necessary to facilitate rapid removal and attachment.

The hydraulic fluid tank shall have; a filler neck with a strainer, a drain plug, a shutoff valve, an air vent and baffles. Its capacity shall exceed the volume of oil required for the operation of any combination of attachments by 50 percent. A sight glass shall be provided to allow the operator to verify that fluid level is sufficient for safe operation without the necessity of opening the system. A low oil level warning and engine shutdown device shall be provided in the cab. A high hydraulic oil temperature warning and engine shutdown device shall be provided in the cab. A low hydraulic oil temperature or high back pressure warning shall also be provided in the cab.

6.17 Controls and Instrumentation

All controls shall be electric over hydraulic type. All instruments and controls shall be labeled in a manner to remain legible for the life of the unit and shall be illuminated. The operator station shall be conveniently mounted in-cab, user friendly and easily accessed by operators wearing heavy winter clothing. Frequently used instruments shall be located in direct line-of-sight and within forearm reach of a medium-sized person sitting in the operator's position. The controls shall allow the operator to direct all functions required to fully operate the equipment. Gauges showing fluid pressures, temperature, and warning readings shall also be furnished. Instruments should display urgency-of-action lights, i.e., green for normal operation, amber for warning, and red for emergency. Instruments shall be illuminated by background lighting regulated by dimmer switches capable of providing infinitely variable lighting intensities. Circuit breakers shall be grouped for easy access and convenience.

The operator's control shall have diagnostic capabilities for the broom, broom engine, and air blast. It must incorporate automatic diagnostics which displays what is wrong with a particular system. All systems for the broom and broom engine must be part of the diagnostics

The operator's control in the chassis cab shall have all the necessary functions to operate the broom and air blast and shall have the following:

- System On/ off (keyed)
- Joystick for lift/lower and left/ right swing. The brush swing, lift and blower nozzle shall have automatic one touch for cycle control. This allows the operator to have hands free operation during cycle movement. Moving the joystick in the opposite direction can reverse the cycle. An additional switch shall allow the operator to use the automatic control or disengage the system.
- Engine oil pressure with visual and audible warning alarms
- Engine coolant temperature with visual and audible warning alarms
- Hydraulic oil temperature with visual and audible warning alarms
- Fuel level with low fuel visual and audible warning alarm
- Low coolant level alarm
- Engine tachometer
- Voltmeter and warning indicators
- Alarms for engine diagnostics and visual warning indicators and displayed faults
- Lights On / Off
- Deflector Up / Down

- Mode Auto / Manual
- Brush On / Off and speed adjustment
- Blower On / Off and speed adjustment
- Engine hour meter
- Brush down and operating hour meter for determining brush life
- Single circuit breaker with Master Battery disconnect

An additional “service” control station shall be supplied unless otherwise specified, at the broom engine assembly when the broom engine is not installed on the carrier vehicle such as a tow broom. This service control station shall have all of the same features as the main operator’s control in the chassis cab. In additions it shall have a selector switch for main or service controls station. The service control station shall have engine speed control priority over main control station.

6.18 Finish and Paint

The broom shall be painted Chrome-Yellow in accordance with FAA AC 150/5210-5B: Painting, Marking, and Lighting of Vehicles on an Airport or as specified. The rear of the broom head on a front mounted broom shall have a non-glare finish to reduce glare for the operator or as specified. Other configuration brush heads can have a non-glare finish.

All equipment shall be cleaned first, then treated as necessary per coating manufacturer’s recommendations with; corrosion inhibitor, primer, putty, sanding, and finally, the finish coating process. The coating of customer specified color shall be applied per the coating manufacturers approved process and shall consist of polyurethane enamel, acrylic enamel, and acrylic urethane, or similar high durability, long life coating having a combined thickness per the manufacturer’s recommendations.

The finished paint shall be free of “fisheye,” “orange peel,” chips, runs, or other imperfections that detract from the equipment's corrosion resistance and appearance.

6.19 Technical Publications

The manufacturer shall furnish two complete sets of manuals, one in hardcopy form and one in electronic format. The set of manuals shall consist of:

- Operation , Maintenance , and Troubleshooting manual
- Supplied equipment manual
- Parts manual identifying every part on the unit both in parts list form and exploded view or schematic form in the case of electrical and hydraulic

6.20 Delivery, Start-up and Training – covered under other sections of this specification.

6.21 Warranty

The equipment provided shall be warranted against defective materials and workmanship for a period of 12 months after 1 the machine is delivered. Warranty includes replacement or repair of defective parts or material and the associated labor to perform the repairs.

6.22 Additional Equipment required

- a. Central drain lines for all fluids from broom assembly
- b. One (1) complete spare set of boxed wafers with spacers is required

- c. LED marker lights located per SAE ARP 5564.
- d. Brush speed control by ground control.
- e. Spare brush core assemblies in order that the cores can be preloaded with new wafers for quick change during snow operations
- f. Set of 4 brush carts for easy brush core loading
- g. Brush speed tachometer with digital readout in the cab
- h. Brush hydrostatic pressure gage with digital readout in the cab.
- i. A complete set of replacement caster wheels , tires, bearings and axle assemblies.
- j. Snow shed hood or snow shield hood to keep snow off the top of the brush hood
- k. Brush head vibrator
 1. Attached to the brush head shall be a dump truck body vibrator to shake snow and ice accumulation off the brush head. 3000 pounds thrust impact force minimum. The vibrator shall be cab controlled with on/off rocker style switch.

SAE ARP5539 Airport Rotary Snow Plow Operational Needs Detail Sheet

APPENDIX C

OPERATIONAL NEEDS DETAIL SHEET

Part I Operating Conditions

SAE ARP5539 Airport Rotary Snow Plow Operational Needs Detail Sheet

The following site and operational information is critical to assure that the rotary snow Plow manufacturer understands the exact nature of the machine that the customer needs to meet operational needs.

Part I Operating Conditions

The unit must be capable of operating at temperatures as low as -10°F to as high as 110°F.

The unit must be capable of cold soaked starting at temperatures as low as 30°F to as high as 110°F.

The unit will be used to remove snow and ice from:

- Runways
- Taxiway s
- Ramp & Gate Areas
- Roadways
- Parking Lots

The unit will transit on the airfield as well as public roads and highways

If the unit must be moved off site for repair or maintenance Unit will be driven with rotary plow installed to repair facility

Axle and Vehicle weight limits must comply with State and local highway load limits

Restrictive conditions relative to length width or height:

- Max overall length with rotary plow installed must not exceed 415 inches
- Max overall length with rotary plow removed must not exceed 320 inches
- Max overall width with rotary plow installed must not exceed 102 inches excluding mirrors

- Max overall width with rotary plow removed must not exceed 102 inches excluding mirrors
- Minimum clearing width must be not less than 100 inches
- Max overall height with rotary plow & chute installed must not exceed 148 inches
- Max overall width with rotary plow & chute removed must not exceed 148 inches

SAE ARP5539 Airport Rotary Snow Plow Operational Needs Detail Sheet
APPENDIX C
OPERATIONAL NEEDS DETAIL SHEET
Part II Operational Requirements

Rotary Plow Certified Performance Requirements

- Minimum snow blowing capacity 3,000 tons/hour
- Minimum cast distance 150 ft.
- Minimum transport speed 5 mph
- Operating Speed
 - low speed - less than 25 mph
 - high speed 45 mph
- Snow Density 20 - 40 lb./cu ft.
- Maximum turning radius 57.5 ft. (wall to wall)