




CITY of NOVI CITY COUNCIL

Agenda Item 2
June 3, 2013

SUBJECT: Approval to purchase an International 7400 SBA 4X2 Single Axle V-Box Truck from Tri-County International Trucks, Inc., the low bidder, in the amount of \$180,442.

SUBMITTING DEPARTMENT: Department of Public Services – Field Operations Division 

CITY MANAGER APPROVAL: 

EXPENDITURE REQUIRED	\$180,442
AMOUNT BUDGETED	\$157,000
APPROPRIATION REQUIRED	\$23,442 (FY 2013-2014 budget amendment)
LINE ITEM NUMBER	101-442.20-984.000 (Heavy Equipment)

BACKGROUND INFORMATION:

The Novi City Council appropriated \$157,000 in the fiscal year 2012-2013 for the purchase of one single axle dump truck with front plow, underbody scraper and wing blade. This truck is equipped with computer ground speed controls that mirror the three previously procured trucks to allow for conservative salt use, operator convenience, and simplified data tracking.

This new equipment replaces a truck (#670) that is 25 years old and has no advanced technology to assist with winter maintenance operations. The specifications for this equipment enhances service to the community by allowing operators to pre-wet salt, which reduces activation time and the amount of salt that scatters off the road (estimated to be as much as 40% without pre-wetting). In addition, this truck is equipped with an anti-icing spray boom for pre-storm application of liquids, a stainless steel V-box to resist corrosion, a 7-foot wing plow (estimated to clear wide subdivisions streets up to 30% quicker than trucks not outfitted with this technology), and a computer system that automatically adjusts salt and liquid application rates based on ground speed and pavement and air temperatures. The new on-board computer system also integrates seamlessly with the PreCise Automatic Vehicle Location system so that all truck operating activities can be reported/downloaded to a manager remotely.

On May 14, 2013 following a public bid solicitation period, two bids were received (one for the International cab and chassis, with the option for two different body outfitters). Upon a thorough evaluation, the DPS staff determined that Tri-County International Trucks, Inc. met all specifications by providing a responsive bid on the International 7400 Set Back Axle (SBA) 4X2 Single Axle V-Box Truck (with components from Truck & Trailer, Inc., its supplier).

The procurement of this dump truck results in a \$23,442 overage from the budgeted amount (\$157,000 budgeted from the \$180,442 expenditure). This overage is attributed to a price increase for the latest model year due in part to meeting diesel exhaust emission requirements. Because the delivery of the truck is not anticipated until the second quarter of FY 2013-2014, a budget amendment would be done in the first quarter. Delivery will take place within four to six months because building a truck chassis requires approximately

three months, and equipping a truck with all specialized equipment can take up to another three months.

RECOMMENDED ACTION: Approval to purchase an International 7400 SBA 4X2 Single Axle V-Box Truck from Tri-County International Trucks, Inc., the low bidder, in the amount of \$180,442.

	1	2	Y	N
Mayor Gatt				
Mayor Pro Tem Staudt				
Council Member Casey				
Council Member Fischer				

	1	2	Y	N
Council Member Margolis				
Council Member Mutch				
Council Member Wrobel				

**CITY OF NOVI
SINGLE AXLE DUMP TRUCK
5/14/2013 11:00**

Single Axle V Box Truck, per specifications:	Tri-County Intl. (1)	Tri-County Intl. (2)	Truck & Trailer Equip. Only	Knapheide Equip Only
Lump Sum	\$180,422	\$192,790	\$89,552	\$101,920
Year/Make/Model	2014 International 7400 SBA 4x2 Chassis	2015 International 7400 SBA 4x2 Chassis		
Est. Chassis Delivery Time	See Bid Letter	See Bid Letter		
Est. Body Build				30-45 Days ARO Chassis
Truck Equipment Vendor	Truck & Trailer	Knapheide		
Extend to MITN	No	No		
Extend to Schools & Northville	No	No		







Tri-County International Trucks, Inc.

5701 Wyoming Ave • Dearborn • Michigan • 48126
Phone 313.584.7090 • Fax 313.584.5681
www.tricotruck.com

COPY

May 12, 2013

Sue Morianti, Purchasing Manager
City of Novi
45175 West Ten Mile Road
Novi, MI. 48375-3024

Bid Letter: Single Axle V-Box Truck, International 7400 4x2 SBA or Equivalent

Dear Ms Morianti,

Thank you for the opportunity to bid on your requirement for a Single Axle V-Box Truck, International 7400 4x2 SBA or Equivalent

This Bid Cover Letter will serve to offer pertinent information to our submittal not fully explained elsewhere. Please read and understand it carefully- if you have any questions please do not hesitate to contact us for further clarification.

The chassis being offered is the 2014 Model Year International 'WorkStar' SBA-7400 SBA 4x2 chassis manufactured at the International assembly facility located in Springfield, Ohio.

This chassis represents the very best efforts of International Truck and Engine Co. and Tri-County International Trucks/ C&S Motors, Inc. the authorized Navistar dealer for Southeast Lower Michigan.

Delivery Information: Build times are at 45-60 days after receipt of order at the Springfield Assembly Facility in Springfield, Ohio. A hard and fast delivery date of the chassis to the bodybuilder can be determined at the time the actual order for the trucks is put into the International order system. Subsequent to that the chosen bodybuilder's build and delivery schedule will prevail as given in their submittal.

Available Discounts: Per this bid all requested software; parts CD-Rom's and the like have been included in this bid. However, you **already have** via recent chassis purchases the latest versions of each of these or they are available online via your already established ISIS/"On Command" access portal. If you wish to delete duplicate items and/or other items from the bid cost let us know and we will discuss your options with you.

Bid Compliance Information (Chassis): The chassis spec of our bid submittal is as given in the bid submittal document. If further clarification is needed or desired please contact us.

Body Vendor Submittals and Compliance Information: Compliance sheets, specifications and pricing have been included for all reputable body vendors who wished to submit such items as relevant to this bid package. The compliance of each body vendor's submittal with the City of Novi's requirements shall be deemed solely the responsibility of the submitting body vendor and the City of Novi. Tri-County International Trucks, Inc. makes no claim in this regard whatsoever and shall be held harmless from deficiencies found in the body and equipment specifications, subsequent installation on the truck chassis and any extended custom electrical programming issues that may arise. We **will** work in close concert with the chosen body vendor to assure (to the greatest extent possible) that the chassis will meet their specific integration requirements.

Warranty Information: Warranty Certificates have been provided for the truck chassis as required in the bid specifications. We urge you to review the enclosed certificates and attachments carefully and to ask any questions you may have. Note that this coverage is "full coverage and/or unlimited coverage but IS STILL subject to limitations and exclusions". This level of coverage is sometimes construed as "bumper to bumper" coverage. Bodybuilder/Equipment Warranty Information will be as supplied as part of the individual bodybuilder bid submittals. Transmission warranty coverage on the Allison 3500-RDS is at five-(5) total years; base warranty and ETC purchased coverage.

Payment Terms: Payment on the chassis portion of the unit is expected at the time the chassis is delivered to the bodybuilder. This avoids needless and unnecessary floorplan and insurance charges. ***If you desire to pay for the entire unit upon completion please add \$1,450.00 per unit to cover the above described costs.*** Upon completion and acceptance of the entire unit you will be billed the remaining amount due.

The Navistar/ International Advantage- Buy American! When you purchase an International chassis you can be assured that you are purchasing a state of the art truck chassis product from an American company that is U.S. based and has been building trucks and truck engines since 1910. Our vocational truck chassis products are built at either our Garland Assembly Facility in Garland Texas or at the Springfield Illinois Assembly Facility. Our state of the art "MaxxFORCE" engines are manufactured in our new Alabama Engine Manufacturing Facility. Your dollars spent stay in the U.S. which is in direct contrast with other North American OEM chassis suppliers... Additionally, the MxF-10 engine still **does not** require the use of SCR (**S**elective **C**atalytic **R**eduction) technology requiring you to add, carry onboard and use Urea fluid as the catalytic agent. With the MaxxFORCE-10 engine you simply fuel up your truck and drive it down the road as you have in the past.

Other advantages of the International 7000 Series truck chassis include the following:

- The unmatched International "Diamond Logic" electrical system architecture offering the widest array of electrical accesses to the bodybuilder *inside the cab* where they are protected from the elements and will cut down significantly on electrically related failures thereby increasing the uptime factor of your equipment.
- "On Command" (formerly "Fleet ISIS") system that provides on-line access to the International Service and Parts database that is continually updated and current as it pertains to your trucks. It can be accessed from any computer with internet access without any special program, disc, etc being installed on your computer.

PLEASE NOTE: this is the *ONLY* way International/ Navistar supplies its parts and service manuals! As with your recent truck purchase of a couple months ago printed manuals of any type are no longer available, period.

Municipal and Government Purchasers of Our Trucks in the State of Michigan: The following agencies have recently purchased International 7000 series truck chassis for like application:

- Genesee County Road Commission
- Genesee County Water Board
- Macomb County Department of Roads
- Hillsdale County Road Commission
- Lapeer County Road Commission
- Wayne County Road Commission
- State of MI-MDOT
- Mackinac Bridge Authority
- Brownstown Township
- City of Auburn Hills
- City of Burton
- City of Birmingham
- City of Dearborn
- City of Novi
- City of Pontiac
- City of Rochester Hills
- City of Richmond
- City of Westland
- Cement City
- Village of Adrian
- Village of Almont
- Huron-Clinton Metropolitan Authority (Huron-Clinton Metroparks)

All of these respected municipal agencies have examined the issues and come to the conclusion that the International 7000 series truck chassis is the best available product for the application. We hope you will see it that way too and become our latest respected and valued customer.

Comments and/or questions should be directed to my attention at (313) 584-7090 x 3213 or via e-mail to mcarracciolo@tricotruck.com. Either way, your inquiry will receive my most prompt and courteous attention.

Respectfully,

Mark J. Caracciolo

Mark J. Caracciolo
Municipal and Severe Service Application Specialist,
Tri-County International Trucks/ C&S Motors of Flint, Inc.

①

Truck & Trailer Specialties
6726 Hanna Lake
Dutton, Mi. 49316
Phone 616-698-8215, Fax 616-698-0972

City of Novi

**Plow Equipment bid for Single axle truck with V box
Bid opening May 14, 2012 @11:00 AM**

Install 10' Monroe MSC-120-84-56 Dual Auger V-Box Spreader with Pre wet system, and single lane anti ice system including the following:

- 6.5 yard capacity
- 120" (10') hopper length
- 84" outside hopper width
- 10 a. 201 stainless hopper sides and ends
- 7 ga. 201 stainless longsills
- Vertical side braces; stainless steel
- Side braces spaced to accommodate two 180 gallon liquid tanks
- Dual cross over hose kit
- Rear discharge with dual 7" step flighted hard surfaced augers
- Rear mounted auger motors with planetary gearboxes, integral speed sensor
- Inverted v over augers, stainless steel, installed
- Top screens with center H beam installed, mild steel, powder black
- Hydraulic shut-off top screen latch kit
- Chassis mounting kit
- Stainless steel rear ladder
- Full length catwalk constructed of stainless steel on street side of body
- Cab shield installed on the front of the V box
- Front bearing grease extensions to rear
- Single lane stainless steel wet boom with Raven flow meter and Banjo boom valve
- 60 gpm closed loop prewet and anti ice system pump.
- Pump draws from each tank
- Nozzle kit, bulk fill kit, flush kit
- Bulk fill kit will include cam lever coupler made by Banjo

Install Spray Mate Poly Fender kit including all necessary mounting brackets for single axle chassis

Install Monroe model 3512 underbody scraper including the following:

- Two 4 in power reverse cylinder with 2" nitrated rods
- Two 3.5 in actuating cylinders with 2" nitrated rods
- All cylinders have poly pack seals
- 1 in circle with 5 in greaseable center bolt
- Circle includes a welded in hardened bushing
- 1 in x 20" x 12' moldboard 6 in cutting edges
- 2 in clevis bosses on power reverse cylinders
- contoured circle clamps with poly type wear pads
- three reinforced moldboard hinges with gussets
- 3/8 in pipe and hoses for faster scraper actuation

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hinge Shaft is 2.5" cold rolled round stock

Moldboard hinges are constructed of 3/8" wall DOM tubing

Adjustable j-50 relief valve is included

Cushion valve for power reverse circuit is included

Bar grating step installed on street side end of moldboard

Kennametal single insert carbide cutting edges

Install 34" Hustling type front hitch including the following

12" structural C channel front bumper with tapered back ends

Double acting lift cylinder

Serrated bar steps at the front bumper

Chain box mounted behind the bumper on the curbside

Roller kit installed on hitch and plow

Roller pins installed in the hitch

Traction strip mounted on the top flange of the front bumper

Install Monroe Fuel/ Hydraulic combination tank behind the cab including the following:

120 gal fuel capacity/30 gal oil capacity

Valve enclosure built into the fuel tank

Ball valve shut offs on supply line and case drain

Suction strainer in supply line

Top mounted Zinga type filter

Low oil sensor with indicator light in the cab

Hydraulic system will be full of AW32 oil

Tank will be painted black

Step assembly mounted on the end of the fuel tank

Install Central Hydraulic system including the following

Force America FASD45L piston pump- 6.0CID

Front pump mounting bracket

Pump flange

Low oil shut down block with override controls

Rom1221 low oil sender in tank

Spicer drive line

Force America Add-a-Fold valve with the following

4 way electric/hydraulic section for scraper with LS relief for down pressure

4 way electric/hydraulic section for scraper swing

4 way electric/hydraulic section for front plow

4 way electric/hydraulic section for Plow swing

3 way EPC section for main conveyor

3 way EPC section for prewet and anti ice system

4 way EPC section for spinner

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Power Beyond end cover

Force Command All single joystick controller with armrest
All necessary hoses and fittings will be Parker type
Stainless steel piping will be used to extend the spreader, spinner, pre wet, and return oil circuits to the rear of the chassis

Install Force America 5100 Spreader controller including the following

LCD display
Spreader controls are mounted in the arm rest controller
Anti ice module is included
Training is included
Install Road Watch temperature sensor and related wiring to input into the 5100 controller

Install Emergency lighting including the following

Sound Off LED amber flashers mounted in poly light boxes
Sound Off type LED stop/Turn and tail lights in poly light boxes
Sound off Led backup lights in poly light boxes
Star model 9016LED-A led mini light bar mounted on the cab shield with a stainless steel brush guard
Whelan 6 led amber Vertex flashers mounted on the plow light bracket
2 sander flood lights mounted at rear
2 flood light mounted above scraper
1 wing light mounted on the side of the v box
LED marker lights on the combination body
Backup alarm included
Betts junction box and related wiring
License plate light and bracket mounted on the poly fender
Plow lights with aluminum plow light brackets mounted on the hood

Install Pro Vision model TV205A camera system including the following

5" LCD screen
Infarred camera mounted at the rear of the chassis
All necessary wiring

Install hitch plate at the rear of the chassis including d rings for safety chains

Install Flaming River electrical disconnect switch mounted inside a poly enclosure with LED indicator light as per specifications

Install Monroe MPR30-47-11-ISCT including the following

30" intake height, 47" discharge height, 11' length
10 gauge roll formed moldboard
five ½" x 4" tapered, one piece, flame cut ribs,
2" x 3" x 3/8" top angle, 4" x 4" x ¾" bottom angle,
horizontal moldboard angle bracing,
¼" landslide plate,
dual compression trip spring assemblies for full moldboard trip,

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4" x 4" x 3/8" cross-tube support

35 degree fixed angle moldboard with heavy duty push frame

Moldboard and push frame are to be 100% continuously welded,

34" plow portion Husting type Hitch

Twin 3" power reverse cylinders

Rubber deflector and blade guides

Screw adjustable skid shoes

Standard plow is powder coated with the moldboard orange and a black push frame.

Stainless steel hydraulic couplers for plow power reverse circuit

Install Monroe model MJW-7' junior mid mount parallelogram type wing including the following:

7 ft moldboard length, 27" intake height, 28" discharge height

4"x 4" x3/4" bottom angle

4" x 10" toe cylinder, 3" x 10" heel cylinder

Moldboard will be 3/16" construction with 3/8", one piece ribs

Heavy duty, spring cushioned push arm with shear pin

Front cross tube with mounting plate

Safety chain shall be installed for transport

Wing Post shall be mounted just ahead of the front drive tire with the rear push arm mounted behind the rear drive tire.

Wing Post shall be a parallelogram design and shall mount directly ahead of the drive tire

Rear push arm is to be equipped with a 6" cushion spring

Rear push arm support brace shall be constructed of 4" x 6" x 1/4" tubing and shall be supported by both frame rails

Hydraulic circuit for the wing shall be equipped with a sequencing valve for proper operation of the wing

The sequencing valve shall have built in load checks to prevent the wing from drifting down when not in use

Sequencing valve shall have built in , manually adjustable flow controls

Wing is to be equipped with hydraulic disconnects for easy removal

Wing will also be equipped with a cushioned rubber stop to prevent it from hitting the body when placed in the stored position

All welding on the moldboard shall be continuous

Wing components and moldboard shall be shot blasted and powder coated

Install Work light mounted on side of V box to illuminate wing

Install poly light box mounted on the end of the wing with a Sound Off LED flashing light

Recycled tire rubber cutting edge

Cast 1/2 moon curb guard bolted on the last rib of the wing moldboard

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Kwik Wire LED lighted 24" blade marker installed on the end of the wing moldboard

Rubber deflector mounted on the wing moldboard

The valve section for the wing shall be electric proportional type valve section

Controls for the wing will be wired into the Patrol Command all

Installed \$89,552.00

City of Novi Options

Install Hydac pressure switches model 6950009 and PS71304MNZ to monitor scraper and wing actuation for AVL system.

Add \$562.00

Dealer Options

Install 1 pair of tow hooks at the rear

Add \$110.00

Install 1 pair of tow hooks at the front of the chassis

Add \$110.00

Install fire extinguisher kit and triangle kit

Add \$174.00

Submitted by Dan Bouwman/Tom Giles

05/08/13



Company Name TRUCK & TRAILER SPECIALTIES

CITY OF NOVI
SPECIFICATIONS

BODYBUILDER SUBMITTAL

SINGLE AXLE V-BOX TRUCK
INTERNATIONAL 7400 4X2 S.B.A., OR EQUIVALENT

1. COMPONENTRY

- a. The bidder shall supply with this bid a certified letter stating that all parts and all componentry, either manufactured or purchased by the bidder which are a part of the equipment bid upon, are new; and further, that no used and/or reconditioned parts or componentry are incorporated in this equipment.
- b. Components and/or accessories not mentioned herein, but necessary to furnish a complete unit, ready to use upon delivery, shall be included and conform to the best practices known in design, quality of material, and be subject to these minimum specifications in full. These specifications shall be construed as minimum requirements. Should the manufacturer's current published data or specifications exceed these, they shall be considered minimum and be furnished.
- c. **Exceptions Disclosure: Any deviations from these specifications, whether in the form of exceptions, clarifications, or substitutions, shall be indicated on the Bid Form and referenced by page and paragraph number and adequately described in this Specifications section. If no such descriptions are provided, the City of Novi will hold the bidder responsible for materials, systems and brand name items as described in the specifications. This Specifications section AND the Bid Form must be submitted in order to be considered a complete bid.**

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

2. GROSS WEIGHT

- a. Minimum GVWR 44,000 lbs.
- YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

3. CHASSIS - INTERNATIONAL 7400 4x2 S.B.A.

- a. Shall be the latest production model, conventional cab, 7400 SBA 4x2 series, with a cab to axle dimension of 114 inches.
- b. The frame shall be pressed steel channel with a yield strength greater than or

- equal to 120,000 P.S.I. and a full C-channel reinforcement for a combined section modulus of 31.72 and a resisting bending moment of 3,806,400 inch pounds minimum. Front frame extension integral. No bolt on or weld on type.
- c. Two (2) front hooks or eyes shall be provided, one (1) mounted on each frame rail adjacent to front bumper.
 - d. Front bumper shall be heavy-duty structural steel channel, 12" in depth, C-type, 25 lb./ft., flared back, approximately 1" from each end to within 1" of front fender so as to protect fenders, two (2) 3/8" I.D. pipes 6" long welded vertically to each end of front bumper.
 - e. All bolted construction, including attachments, must use grade-8 bolts and/or huck bolts.
 - f. Ample frame must be provided for mounting necessary equipment (i.e. dump body, hoist, front pump etc.). Frame cut after mounting of equipment shall be held to truck manufacturer's recommended standards.
 - g. 1310 front flange engine PTO adapter plate shall be supplied.

___ YES, MEETS ALL SPECIFICATIONS

___ NO, DESCRIBE DEVIATIONS:

4. CAB

- a. Manufacturer's conventional cab of sufficient bumper to back of cab dimension so that the power plant (engine) is located ahead of the cowl and requires no special "in cab" housing.
- b. Driver seat – air suspension cloth hi-back – lumbar support integral headrest. Passenger seat – non-suspension high back cloth – fixed back w/ under seat storage
- c. Door-mounted dispatch compartment.
- d. Left hand arm rest, sun visors, grab handles and running boards, exterior mounted sun visor with L.E.D. marker lights.
- e. Steering column shall be tilting.
- f. Air horn. Single, frame mounted.
- g. OEM AM/FM radio with standard speakers and auxiliary input, with Bluetooth and microphone.
- h. Accommodation package for 2-way radio.
- i. Cab sound insulation package.
- j. Cigarette lighter for diagnostic equipment power.
- k. Left and right hand rectangular heated and remote power mirrors, 6" x 16", "West coast" breakaway type, with auxiliary convex mirror bright finish heads, and brackets w/ L.E.D. clearance lights.
- l. Illuminated direct-reading gauges, including: Air Pressure Gauges; Tachometer, Speedometer, Odometer, Fuel Gauge, Water Temperature Gauge, Oil Pressure Gauge Direct Reading, Voltmeter, Hour meter, High-Temperature Water Warning Light, and Air Cleaner Restriction Gauge Mounted inside Cab.
- m. Engine Alarms: Air, audible, Oil and water, audible and visual.
- n. Standard Tilt hood (without hood hatches) and fixed grille.
- o. Electric intermittent windshield wipers with heated blades.

- p. Tinted glass throughout, with power windows left & right w/ driver control.
- q. Electronic throttle control, variable.
- r. Instrument Panel, Ergonomic style.
- s. Painted IHC Code #2303RED (Cab).
- t. Factory installed front fender flares.
- u. Fitted Floor Mats.
- v. Cab air ride.
- w. Door locks shall not be programmed
- x. Muffler stack shall not exceed cab height by more than 4 inches.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

5. ENGINE

- a. International MaxxForce 10, Diesel, 310 HP, 1050 lb-ft Torque @ 1,200 RPM, 2200 RPM Governed Speed, #2 Bell Housing or larger.
- b. Fuel/water separator spin-on type, heated type.
- c. Air cleaner, dual element heavy-duty type with restriction gauge in dash and under hood intake with inside-outside valve or integral snow separation module.
- d. Automatic hi-temp low oil pressure engine shutdown. Block heater; plug at driver's side, with provision for an oil pan heater.
- e. Provide manufacturers temporary fuel tank.
- f. Horizontal muffler and vertical tailpipe must be mechanically fastened to frame rails behind cab for maximum stability, with safety shield. Furnish stainless steel exhaust pipes and clamps. Furnish 90 degree elbow pipe above muffler exhaust.
- g. Radiator shall have necessary frontal area to provide adequate cooling when used in conjunction with transmission and hydraulic coolers and shall have no cut-outs or holes for PTO shaft, On/Off cooling fan drive
- h. Silicone hose package, radiator and heater hoses.
- i. Aluminum 1588 square inch Radiator with 885 square inch charge air cooler.
- j. Engine control remote mounted (provision for body builder installation of PTO controls) and ground speed pickup wire.
- k. Engine must be a wet sleeve type w/ extended life coolant to -40° below zero.
- l. Extended warrantee engine & engine electronics including injectors. Service contract for 84 months, 100,000 on transmission components.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

6. FLUID LEVELS

- a. All hydraulic oil tanks, if provided, shall be full upon delivery.
- b. All engine fluids including reservoirs, if provided, shall be at manufacturer's suggested levels at delivery.
- c. All fluid reservoirs shall be properly labeled in a visible location.

____ YES, MEETS ALL SPECIFICATIONS
____ NO, DESCRIBE DEVIATIONS:

7. TRANSMISSION

- a. Allison Electronic 3500 RDS P; 6-speed automatic, with T-bar shifter.
- b. 5 year warranty (2 yrs. Std. plus 3 yrs. extended).
- c. Magnetic drain plug.
- d. Temperature gauge, direct reading.
- e. External Transmission Cooler, water to oil type.
- f. Synthetic Transmission oil.
- g. Trans oil level sensor.
- h. Locate transmission Electronic Control Module inside cab interior
- i. External transmission cooler, to follow Allison recommended specifications.

____ YES, MEETS ALL SPECIFICATIONS
____ NO, DESCRIBE DEVIATIONS:

8. ELECTRICAL

- a. 12 volt light system throughout.
- b. Daytime running lights and fender mounted turn signals dual faced amber.
- c. Halogen headlights.
- d. Electric junction box in cab.
- e. Batteries – three 12-volt, maintenance free, 2100 CCA at 0 degrees F – combined with jump start – stud. Truck manufacturer's battery box shall be re-positioned per Fleet Managers instructions at the time of construction. Battery box must be vented by drilling (2) two (1/2") half inch diameter holes in front and rear side panels.
- f. Leece-Neville 135 amp Alternator w/ higher current output @ idle.
- g. Starter shall be heavy-duty type with thermal over crank protection.
- h. Lighting shall conform to federal Motor Vehicle Safety Standards #108.
- i. Electrical system shall be protected by circuit breakers, manual-reset SAE Type II.

j. Install weather tight connectors on back-up alarm.

Truck & Trailer provides

*TEST
Comply*



- k. Wiring for all rear lights shall be incorporated with the Betts lighting system w/ 8 foot of rear stop tail light wire furnished by chassis manufacturer.
- l. Grommets must be used where wire passes through steel gussets and cross members.
- m. All Betts lighting wiring must conform to truck color code. *T&T*
- n. 6-Pak Switch Rocker type Lighted – IHC supplied.
- o. The Betts lighting system shall be connected starting from inside the truck cab at a terminal strip, to a sealed plastic junction box, and mounted at the left rear of the V-box. All connections will be sealed in the junction box with no other connection in the harness, other than at the light fixtures.
- p. Crossover wiring harness shall be installed on 2nd. Underbody cross member forward of rear most cross member.
- q. Auxiliary Harness front head lights and turn signals for front plow application.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

9. FRONT AXLE, SPRING, AND STEERING

- a. Axle capacity not less than 18,000 lbs. set back
- b. Spring capacity not less than 9,000 lb., each at ground – multi-leaf.
- c. Power assist steering – dual.
- d. Double-acting shock absorbers.
- e. Oil lubricated wheel seals with sight gauge.
- f. Three stage taper leaf front suspension.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

10. REAR AXLE AND SUSPENSION

- a. Single speed axle Meritor RS-26-185, Gear ratio: 5.63
- b. Axle capacity not less than 26,000 lbs.
- c. Rear axle ratio to provide road speed of 65 mph at GVWR while providing compatibility with manufacturer's recommendations for engine, transmission and other drive-train components. Minimum gear ratio 5:63
- d. Suspension capacity not less than 31,000 lbs. A 4,500 lb helper spring on each side shall also be included.
- e. Magnetic drain plug.
- f. Driveline – To be equipped with Spicer Lifeline Series Driveline to match torque requirements.
- g. Driver controlled rear locking differential.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

11. BRAKES

- a. Full air brakes, S-Cam, Auto slack adjusters and anti-lock A.B.S.
- b. Front brake shoes shall be 16-1/2" x 6" OR Disc Brakes
- c. Rear brake shoes shall be 16-1/2" x 7".
- d. Bendix BW750 Series 13.2 CFM.
- e. Heated DV2 Automatic Drain Valve.
- f. Air drier AD-9 or equal model.
- g. MGM Parking brake.
- h. Backing plate shields for brakes, front and rear.
- i. Brake Chambers installed in front of rear bulk head.

___ YES, MEETS ALL SPECIFICATIONS
 ___ NO, DESCRIBE DEVIATIONS:

12. WHEELS AND TIRES

- a. Front - 385 65R22.5, Michelin "XZY-3" 18 ply front (Qty. 3)
- b. Rear - 12R22.5, Michelin "XZY-3" 16 ply rear (Qty 5)
- c. Hub piloted disc wheels, 10 stud - 22.5 x 8.25. (Qty 5) rear & front 12.25/DC (Qty 3).
- d. Wheel Check safety indicators to be installed on all lugs (green).

___ YES, MEETS ALL SPECIFICATIONS
 ___ NO, DESCRIBE DEVIATIONS:

13. MISCELLANEOUS EQUIPMENT

- optical* a. Rear tow hooks mounted to frame, (1) pair. - *Dealer option*
- T&T* b. Chain box to be mounted on the passenger side of the front bumper. - *Comply*
- T&T* c. Two expanded metal front bumper steps driver and passenger side. *Comply*
- T&T* d. Expanded metal traction strip placed across the top of the front bumper. *Comply*
- T&T* e. Electronic 12-volt back-up alarm installed on drivers' side below left rear taillight/turn signal assembly below steel guard. *Comply*
- Dealer* f. O.E.M. Air Conditioning System with fresh air filter. - *Dealer*
- T&T* g. Furnish and install 1/2" thick rubber mud flaps with anti-sail feature behind rear tires secured to fender understructure. - *Attachment To Poly Fenders*
- T&T* h. Furnish and install Preco 1040 back-up alarm. *Comply*
- T&T* i. Rear mount camera (monitor salt spreading and back up operation) *Comply*
- T&T* j. Install license plate frame and light. *Comply*

Dealer opt

- k. Furnish safety items, triangle reflector kit and 5 lb fire extinguisher.
- l. Two service manuals covering truck and chassis, added auxiliary equipment, and all other components included in these specifications that may require testing, adjustment, part replacement, and periodic preventive maintenance. All of the aforementioned detail shall also be provided on a CD that is compatible with Windows 7. Additional circuit diagrams & electrical system trouble shooting manuals shall be delivered as paper only.

Dealer

- m. Two parts manuals covering this equipment, all added auxiliary equipment and all other components included in these specifications that may require part replacement, and periodic preventive maintenance, CD-ROM and paper type. Also Master Diagnostic's software - ZTS4463-4 and IC3 Com interface cable ZTSE 4632.

T & T to provide manuals for Equipment

Dealer

- n. One set of all specialty tools to be used for mechanical repair of all added auxiliary equipment and components included in these specifications.

See Below

- o. Vendor must specify warranty coverage and location (s) of repairs of this equipment, all added auxiliary equipment and all other components that are included in these specifications that may be different than that of the general warranty coverage and/or extended coverage.

Dealer

- p. All equipment as specified, manuals, and special tools must be delivered to the Department of Public Services - Fleet Maintenance Section, 26300 Lee BeGole Dr. (F.K.A. Delwal Dr.), Novi, Michigan 48375. No payment shall be made until all items are delivered and verified by the City of Novi.

___ YES, MEETS ALL SPECIFICATIONS

___ NO, DESCRIBE DEVIATIONS:

On Warranty Repairs will be performed at the Howell serviced location

14. SPECIFICATIONS FOR V-BOX

Comply

- a. Install Monroe 10 ft chassis-mounted stainless steel V-box with a liquid capacity of not less than 360 gals.
- b. Furnish and install 2 inch female plastic cam lever couplers for filling liquid tanks. Maximize tank equalization.
- c. 84" outside hopper width.
- d. Dual 7" augers.
- b. 10 a. 201 stainless steel hopper sides and ends.
- c. 7 ga. 201 stainless longsills
- d. Vertical side braces, stainless steel
- e. Side braces spaced to accommodate liquid tanks.
- f. Rear discharge with dual 7" step flighted hard surfaced augers.
- g. Rear mounted auger motors with planetary gearboxes and integral speed sensor.
- h. Top screens with center H beam installed, stainless steel.
- i. Hydraulic shut-off screen latch kit.
- j. Chassis mounting kit.
- k. Stainless steel rear ladder.
- l. Cab shield installed on the front of the V-box.

Comply

- m. Front bearing grease extensions to rear.
- n. Single lane stainless steel wet boom with Raven flow meter and Banjo boom valve.
- o. 11 gpm closed loop pre-wet system.
- p. Flip up spinner and anti-ice bar assembly for ease of unloading.
- q. Install Spray Mate Poly Fender kit including all necessary mounting brackets.
- r. 1.25" liquid fill tubes that run from tank to tank utilizing all tank ports.
- s. Stainless catwalk along drivers side liquid tanks that extend the length of the box
- t. The anti-ice liquid pump shall have the capacity to pump 50 gallons per minute.

60 gal./minute

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

15. UNDER-TRUCK SCRAPER SPECIFICATIONS

- a. Hangerboard - minimum 1/2" formed plate with 1/2" steel reinforcements the entire length of hinge line, with a hardened, replaceable center pin bushing.
- b. Hinge Shaft - 2-1/2" O.D. x 96 linear inches minimum high carbon steel running the total length of the hangerboard (660 square inches of bearing surface area) with zerk fittings located along the hinge line for lubrication. The hinge system shall consist of two (2) 6" end hinges with greasable thrust bearing at each end of hinge shaft and one (1) 15" center hinge with six attaching bolts; all 3-1/4" O.D. x 2-9/16" I.D. The hangerboard cut-out for the center hinge bracket shall have beveled corner cuts and have a 3/8" x 1" reinforcing bar welded over the entire length of the bracket.
- c. Moldboard - 1" thick x 20" wide x 12' long, heat treated carbon steel reinforced in the center with 2-1/2" x 2-1/2" x 1/2" angle 52" long. The bottom shall be offset to accommodate beveled cutting edges.
- d. Actuation and shock assembly - moldboard to be actuated by two Root - Monroe designed 3-1/2" I.D. x 10" stroke double acting cylinders with 2" nitrated piston rods and 3/8" ports & plumbing. Cylinders to be mounted horizontally on the scraper by 1" thick reinforced steel trunnion brackets. The cylinder shall be retained in the housing by means of a retaining ring consisting of 1/2" w x 1-1/2" long tubing secured to the shock housing with three 5/8" bolts. Trunnion bearings to be 2-3/4" O.D., 3/8" wall carbon steel bored to accept 2" trunnion pin.
- e. Circle - 1" thick solid steel, notchless, 1 pc. design. The center pivot hole shall have a 5" I.D. replaceable bushing for center pin. The center pin is to have a 6" min. O.D. top, 5" O.D. shoulder, 1-1/4" O.D. stub shaft, grease zerk and bolt through hangerboard with three (3) 3/4" Gr. 8 attaching bolts. Circle clamps shall be 20.5" with 1" top plate. The lower plate shall be welded to hangerboard. The top plate and a polyethylene shim shall bolt to the lower plate with 3-1" Gr. 8 bolts with locknuts.
- f. Power Reverse to be cab controlled with cushion valve relief, and shall be accomplished using two 4" bore by 14-1/2" stroke double acting cylinders with 1/2" ports working in tandem and providing positive hydraulic locking. The

piston rods shall be nitrated CR steel 2" in diameter. The piston rod ends and the barrel ends of the cylinders shall be welded 2" thick greasable wear blocks. The hangerboard bosses shall be 3" O.D. tubing, solid welded top and bottom of the hangerboard. Both the anchor and live end pins shall be 2" in diameter and held in place by a 5/8" gr. 8 bolt with nut & washer.

- g. Installation to include modification or relocation of exhaust parts, battery boxes, air tanks & dryers, etc. to achieve maximum height and allow for proper operation.
- h. Hydraulic power is to be provided by a central hydraulic system (specified elsewhere) with proper pressure and flow requirements for proper and satisfactory operation.
- i. Under body scraper must be installed by an authorized dealer or distributor for the City of Novi, and to include modification or relocation of exhaust parts, battery boxes, air tanks and dryers, etc. to make for proper height of 20-1/2" to bottom of circle (the only exceptions to this are if drive line, transmission, transfer case, etc. are too low). Hydraulic power to scraper is to be 1,500 psi maximum pressure for up and reverse functions and 500 psi for down pressure and approximately 10 GPM flow to provide for satisfactory and safe operation.
- j. Step on driver's side, expanded metal on moldboard.
- k. Install carbide cutting edge. - *Single Insert Kenametal Carbide Cutting Edge*

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

16. CENTRAL HYDRAULIC SYSTEM

- a. Force FASD45L piston pump - 6.0CID.
- b. Front pump mounting bracket.
- c. Pump flange.
- d. Low oil shut down block with override controls.
- e. Rom1221 low oil sender in tank.
- f. Spicer drive line.
- g. Valves a Force Add-a-Fold with the following:
 - 4 way *Electric/Hydraulic* controlled section for scraper with LS relief for down pressure.
 - 4 way electric/hydraulic controlled section for scraper swing.
 - 4 way electric/hydraulic controlled section for front plow.
 - 4 way electric/hydraulic controlled section for plow swing.
 - 3 way EPC section for main conveyor.
 - 3 way EPC section for pre-wet and anti-ice system.
 - 4 way EPC section for spinner.
 - Power Beyond end cover.
- h. Force America Command All controller armrest compatible.
- i. Stainless steel valve enclosure - *Not Needed - Valve mounted in Fuel/Hyd. Tank*
- j. All necessary hoses and fittings will be Parker type

- k. Stainless steel piping will be used to extend the spreader, spinner, pre wet, and return oil circuits to the rear of the chassis.

YES, MEETS ALL SPECIFICATIONS

NO, DESCRIBE DEVIATIONS:

Comply on all items except Stainless Steel Valve
enclosure. Valve will be housed in the fuel/hyd.
combination tank kit.

17. CONTROL CENTER:

The control center shall be a Force America Command All MJ series with 5100 spreader control or equivalent. Command center shall be determined in the pre-build meeting.

- a. Controls for all valve functions, electronic spreader control, and auxiliary lighting will be integrated into a single, self-contained control center. The control center shall be a padded armrest style that is ergonomically designed. Control center shall be modular in design for ease of installation and service, and wiring and connectors shall be color coded throughout. A sealed, pre-wired harness for all valve controls must be provided. All components must be durable for long life and trouble free operation.
- b. The controller shall have a single joystick handle with integrated miniature joysticks. The hoist control shall be fully proportional and operated with a mechanical lift-to-operate interlock for safety as required. The single joystick handle shall accommodate up to 4 miniature dual axis thumb operated joysticks for controlling up to (8) hydraulic valve functions simultaneously. A two-step select-and-operate system is unacceptable. There will also be 2 momentary switches or 1 momentary rocker switch for remote spreader blast and standby. Controls for spreader must be located on armrest at the operator's fingertips. The control center must also include switch controls for up to 8, 15 amp auxiliary functions.
- c. The electronic spreader control shall be designed for, closed-loop control of granular and pre-wet liquid application as a standard and shall have the ability to control direct liquid application separately or simultaneously when optional equipment is selected. The electronic spreader control shall have a field replaceable battery backup that protects memory functions. Data memory shall be 512K RAM. For data logging, the unit shall have the capability to retain up to four thousand (4000) events. The electronic spreader firmware shall be upgradeable by downloading files from the supplier's web site at no charge to the municipality for the life of the unit. The unit must be protected from reverse polarity, as well as be over-voltage protected by using a five-amp reset circuit breaker. All circuit boards to be conformal coated. The spreader control is to be capable of self-diagnostics for system errors and correction procedures.

d. Spreader display unit shall be a "heads up" display to be mounted in specified location determined in the pre-build meeting. It shall be a 5" diagonal LCD with a viewing area of 3" X 4", TFT type, color display with 320 X 234 screen resolution. The viewing angle shall be at least +/- 45 degrees horizontal and +/- 30 degrees vertical and is to be viewed from the 6 o'clock position. The display contrast ratio shall be at least 200:1. The LCD shall have hardened glass that is covered with an anti-reflective coating. The display shall have no integrated dials or pushbuttons and should not be touch screen. The display must be protected against ingress of spilled or splashed liquids as well as dust. One USB port shall be included for purposes of programming and upgrading the firmware of the display. The operating temperature range shall be a minimum of -20°C to +70°C. The display shall automatically reduce the brightness of the LCD for nighttime operation by the use of one analog input that monitors the vehicle dash setting. The display shall communicate with the spreader control and shall include the following spreader information:

- Granular application spread rate – Set application rate and actual application rate
- Pre-wet application spread rate – Set application rate and actual application rate
- Anti-Ice application spread rate – Set application rate and actual application rate
- Application rates available in standard or metric units
- Graphical representation of spinner set rate
- Mode of spreader operation
- Indication of spreader status to differentiate between spreading, standby, and blast
- Plain text error messaging of active errors
- Road temperature (°F or °C) – (appropriate sensors shall be supplied, installed and integrated with control center)
- Ambient temperature (°F or °C) – (appropriate sensors shall be supplied, installed and integrated with control center)
- Current date and time
- Data menu to include the following items:
 - Current output readings to valve coil for the auger, spinner, pre-wet, and anti-ice functions
 - Season cumulative spreader information including material weight and volume, distance, and time for each material and operation mode
 - Current cumulative spreader information including material weight and volume, distance, and time for each material and operation mode
 - Error log in plain text to include the last 125 errors associated with the spreader control including the date and time of each error
 - Truck battery voltage
 - Truck speed (miles per hour)
- All of the above items to be displayed simultaneously if so desired

- e. The display screen shall include four warning options to include body up, low oil, oil temp, and filter bypass with an optional audible alarm. These warnings shall be in plain English text and are to be red in color. These alarms are to be functional regardless of spreader operation and status.
- f. The control unit shall have password protection to prevent unauthorized access to the calibration parameters. The password shall be programmable. The unit shall also utilize iButton technology that is capable of using a Supervisor key to provide access to the parameters without the access code. As an option, iButton technology shall be available for saving and loading of calibration parameters through the use of a Calibration key. The control unit shall be capable of self-calibration of auger/conveyor feed rates and require no additional timepieces to calibrate. Programming shall allow for blast function to be set one of three ways: momentary, timed or by distance traveled. The unit must also be capable of spreading up to four different granular materials and ten programmable spread rates. Controller shall have programmable nomenclatures for granular and pre-wet materials. Programming shall provide for automatic default to open loop in the event of a feedback failure. The unit must provide three operational modes: manual, open loop (ground speed only) and closed loop (ground speed with auger/conveyor feedback). Programming shall also provide for two-speed axle input as required.
- g. The unit must be capable of downloading data to a serial printer or PC computer through the use of a bi-directional RS232 port when complete data is required. The unit must have ability to control four compensated valve outputs. Unit shall have a standby (pass) and blast feature as standard. Unit shall provide stationary unload functions on granular, pre-wet and direct functions. The unit shall also be upgradeable for event logging and temperature compensation. The control shall have a programmable jump-start speed feature to provide immediate material flow at one MPH. The unit must interface with provided road temperature sensors, direct liquid application systems, and AVL/data management equipment. For other seasonal use, the control must have the ability of measuring distance driven in feet or meters, using a start, stop, and reset method. It shall also be upgradeable for dust control application.
- h. Truck diagnostic calibration shall be completed prior to delivery
- i. A minimum training and material calibration test of 16 hours in the field shall be provided within 7 business days of the owner's request.
- j. ~~Recurring~~ system training and calibration of 16 hours annually shall be supplied by the vendor for 5 consecutive years after procurement of the control center within 7 business days of the owner's request.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

18. Install 34" Husting type front hitch:

- a. 12" structural C channel front bumper with tapered back ends.
- b. Double acting lift cylinder.
- c. Serrated bar steps at the front bumper.
- d. Installed roller pins, rollers mounted to hitch frame base.
- e. Tow hooks mounted at the front and at the rear of the chassis.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

19. Fuel/Hydraulic combination tank behind the cab:

- a. 120 gal fuel capacity/30 gal oil capacity; 7 ga. Steel construction.
- b. Ball valve shut offs on supply line and case drain.
- c. Suction strainer in supply line.
- d. Top mounted Zinga type filter.
- e. Low oil sensor with indicator light in the cab.
- f. Hydraulic system will be full of AW32 oil.
- g. Tanks will be painted black.
- h. Cross over hose kit.
- i. Valve enclosure to be incorporated into combination fuel and hydraulic tank construction behind cab.
- j. Add bar stock step/catwalk to driver's side near fuel tank.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

20. EMERGENCY LIGHTING:

- a. Sound Off LED amber flashers mounted in poly light boxes.
- b. Sound Off type LED stop/Turn and tail lights in poly light boxes.
- c. Sound off Led backup lights in poly light boxes.
- d. Star model 9016LED-A led mini light bar mounted on the cab shield with a stainless steel brush guard.
- e. 2 auxiliary flood lights mounted at rear, angled toward pavement.
- f. Flood lights mounted above scraper on left and right side.
Flood light mounted on v-box to illuminate wing plow.
- g. LED marker lights on the combination body.
- h. Plow lights and aluminum plow light brackets mounted on hood.

- i. Install hitch plate at the rear of the chassis frame for future hitch with tow hooks. Install Flaming River electric disconnect switch mounted inside a poly enclosure with LED indicator light as per specifications.
- j. Install Whelan Micro Amber 6 LED Vertex part 3 01-0268715-10A self-powered, mounted in front plow light bracket facing forward.

YES, MEETS ALL SPECIFICATIONS
 NO, DESCRIBE DEVIATIONS:

21. SNOW PLOW, Root model TPR-PR-10':

- a. Moldboard (tapered): 11' long on top, 47" height at rear, 30" height at nose, 8'2" width of cut at 35 degrees, five (5) 1/2" x 3" vertical ribs, 4" x 4" x 3/4" moldboard bottom angle, 3" x 3" x 3/8" top moldboard stiffener, moldboard thickness to be 10 gauge, 5/8" x 8" x 11' high carbon steel cutting edge with SHS punching. Adjustable caster assemblies with skid shoes to be mounted on the plow. A rubber snow shield to be mounted across the top of the plow.
- b. Plate semi-circle: 4" square x 1/2" wall tube front drive frame member welded to a 1/2" plate. The drive frame member shall be 87-1/2" long and have 6-1/2" inner ears and 2-3/4" outer hinge ears. The semi-circle shall consist of a 1/2" x 64" flame cut main plate welded to the front drive frame tube, with 3-1/2" x 3-1/2" x 1/2" stop angles to be gusseted with 1/2" x 3-1/2" bars.
- c. Hitch to be Root 34" quick detachable (Husting type). Truck half is to be welded to a 10" x 20# channel bumper, have top & bottom bracing with bumper & bracing all being bolted to frame – Not welded. The bumper ends are to be flared back just enough to assure clearance of plow when fully reversed.
- d. Designed for easy mount on all types of hitches.
- e. 4x4 x 3/4" bottom angle.
- f. Moldboards are backed with 1/2" one-piece rib for added strength.
- g. Rugged construction designed to last.
- h. Heavy duty structural push frame.
- i. Continuously welded to eliminate corrosion pockets.
- j. 100% welded.
- k. 5/8" x 8" cutting edge.
- l. Skid shoes on adjustable gear.
- m. Rubber deflector.
- n. Plastic blade guides.
- o. 34" Husting hitch.
- p. Plow lift is to be 12-15" actuated by a 3" double acting lift cylinder.
- q. Power angling to be twin three (3) inch cylinders with a cushion relief valve.
- r. Hydraulic power is not included in this specification. A central hydraulic system should supply approx. flow of 6 GPM with a maximum pressure of

- s. 1500 psi.
- s. For best installation of above hitch, cab & chassis should be ordered with minimum 18-24" integral frame extension.
- t. Plow and truck hydraulic quick connection shall be stainless steel and manufactured by "Parker" (1/2" SM-502-8FP Male) (1/2" SM-501-8FP Female).
- u. Installation is to include being able to remove front pump, use front tow hooks, etc. Any modifications to hood or grill for clearance of hitch must meet approval of City personnel.

 YES, MEETS ALL SPECIFICATIONS

 K NO, DESCRIBE DEVIATIONS:

 Not Root Type - Monroe Model MPFA 30-47-11
 All other Items Comply

22. **Mid-mounted 7' Junior Wing; Monroe Model MJW-7' junior mid mount parallelogram type wing:**

- a. 7 ft moldboard length, 27" intake height, 28" discharge height
- b. 4"x 4" x3/4" bottom angle
- c. 4" x 10" toe cylinder, 3" x 10" heel cylinder
- d. Moldboard will be 3/16" construction with 3/8", one piece ribs
- e. Heavy duty, spring cushioned push arm with shear pin adjustable to 45 degrees from truck.
- f. Front cross tube with mounting plate
- g. Safety chain shall be installed for transport at any adjusted angle.
- h. Wing Post shall be mounted just ahead of the front drive tire with the rear push arm mounted behind the rear drive tire.
- i. Wing Post shall be a parallelogram design and shall mount directly ahead of the drive tire
- j. Rear push arm is to be equipped with a 6" cushion spring
- k. Rear push arm support brace shall be constructed of 4" x 6" x 1/4" tubing and shall be supported by both frame rails
- l. Hydraulic circuit for the wing shall be equipped with a sequencing valve for proper operation of the wing
- m. The sequencing valve shall have built in load checks to prevent the wing from drifting down when not in use.
- n. Sequencing valve shall have built in, manually adjustable flow controls
- o. Wing is to be equipped with hydraulic disconnects for easy removal
- p. Wing will also be equipped with a cushioned rubber stop to prevent it from hitting the body when placed in the stored position at any adjusted angle.
- q. All welding on the moldboard shall be continuous
- r. Wing components and moldboard shall be shot blasted and powder coated
- s. Install Work light on frame of truck to illuminate wing
- t. Install poly light box mounted on the end of the wing with a Sound Off LED flashing light

Comply

Comply

Cast - Not Carbide

- u. A rubber cutting edge 5" x 10" x 83" shall be installed, with carbide curb guard) - *Recycled Type Cutting Edge* *Cast 1/2 Moon Curb Guard*
- v. Installed 1/2" thick rubber show deflector.

Comply

- Comply* - w. 24" lighted marker to be installed and activated with wing plow safety light.
- Comply* - x. An additional valve section shall be installed in the main control valve to actuate the wing.
- Comply* - y. The valve section for the wing shall be electric proportional type valve section
- comply* - z. Controls for the wing will be wired into the Force Patrol Command All

___ YES, MEETS ALL SPECIFICATIONS

___ NO, DESCRIBE DEVIATIONS:

All items comply except the wing curb guard is
steel casting - Not carbide.

23. Local Service Support

- A. The successful bidder and truck equipment supplier must have factory trained service personnel and stocked repair parts at a factory authorized service center located no more than one hundred fifty (150) miles from the City of Novi Field Services Complex. This stipulation is required to ensure a quick turn-around of a truck that requires repair so that down time will be greatly shortened. This also will reduce the time spent by City of Novi personnel in delivery and pick-up of truck in need of repair.

Name of truck equipment vendor:

Truck & Trailer Specialties, Inc

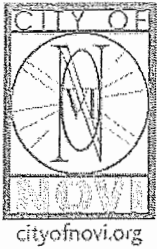
Address:

1200 Victoria

City, State:

Howell, Michigan

PRODUCT BROCHURE TO BE SUBMITTED WITH BID.



2ND BODY CHASSIS QUOTE →

CITY OF NOVI
BID FORM

SINGLE AXLE V-BOX TRUCK
INTERNATIONAL 7400 4X2 S.B.A. OR EQUIVALENT

We the undersigned as bidder propose to furnish to the City of Novi, according to the specifications, conditions and instructions attached hereto and made a part thereof:

A. Single Axle V Box Truck, per specifications w/ TRUCK TRAILER BODY; EQVIA. QUOTE

Lump Sum \$ 180,422.00 EA. TRK.

Year/Make/Model 2014 MY INTERNATIONAL 7400 SBA 4x2 CHASSIS

Estimated Chassis Delivery Time SEE BID LETTER Days

Estimated Body Build SEE BID LETTER Days

Estimated Customer Delivery (Total days) SEE BID LETTER Days

We acknowledge receipt of the following Addenda: Ø
(please indicate numbers)

This bid submitted by:

Company (Legal Registration) TRI-COUNTY INTERNATIONAL TRUCK, INC.

Address 5701 WYOMING AVE

City DEARBORN State MI Zip 48126

Telephone (313) 584-7090 x3213 Fax (313) 584-5681

Agent's name (please print) MARK J. CARACCIOLA

Agent's Title SENIOR SVC & MUNICIPAL APPLICATIONS SPECIALIST

Agent's signature Mark J. Caracciolo

E-mail mcaracciolo@tricotruck.com

Date 04/30/2013



Monroe 3500 Series Underbody Scraper

**Monroe's NEW
3500 Series Scraper...**

Clearing The Way To The Future

New & Improved Features

- 3-bolt hold down block, shaped to follow the contour of the circle assembly
- $\frac{3}{8}$ " UHMW poly wear plates located under the circle hold down blocks ease circle movement
- Reinforced circle assembly arms provide increased support for the reversing cylinders



Quality Engineered Features are Standard on the 3500...

Specially manufactured hanger-board designed and engineered for optimum strength and durability.

5" center pin lubricated with a grease zerk for ease of maintenance.

Contour shaped hold down blocks match the radius of the circle for increased strength.

Actuating canister/cylinder assembly retained by a 4-bolt flange.

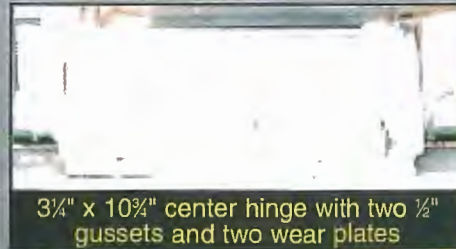
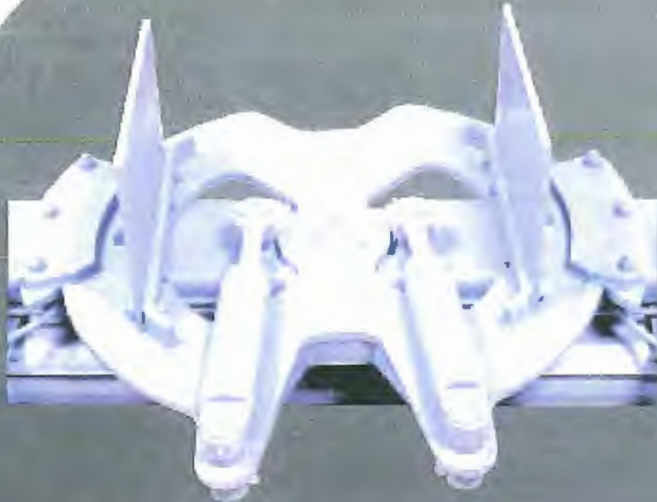
Reversing cylinders mounted to the circle using 2" pivot pins.

Reversing Table

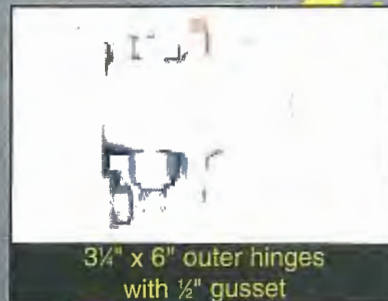
- Reverses to a full 45° rotation
- 20½" x 7" hold down blocks with ¾" UHMW wear plates
- Two 4" double acting reversing cylinders with 2" hard nitrided rods
- 900 PSI cross-over relief valve



Hydraulic steel tubing



¾" x 10¾" center hinge with two ½" gussets and two wear plates



¾" x 6" outer hinges with ½" gusset

Product updates and specifications are subject to change without notice.

Manufactured by:

Monroe Snow & Ice Control
A Division of Monroe Truck Equipment
1057 W. 7th Street
Monroe, WI 53546
Phone: 800-888-0100
Fax: 808-828-8000

Distributed by:



MTE WING PLOWS



***Front
Mount***

***Mid
Mount***



***Rear
Mount***

MTE Front-Mount Wing



Full Trip



MONROE
SNOW & ICE CONTROL
 A Division of Monroe Truck Equipment

MTE Mid-Mount Wing



Monroe offers the most complete line of side wing plows in the industry. Moldboard lengths are from six to twelve feet. Various intake and discharge heights. Standard features include: open rib design, $\frac{3}{16}$ " moldboard, $\frac{1}{2}$ " one piece ribs, $\frac{3}{4}$ " bottom angle, structurally engineered extend 50 front post, integral mechanical floats, nitrated cylinder rods, plated hardware, all steel components shot blasted and powder coated prior to assembly.

Options

- ➡ Right, Left or Dual Mount
- ➡ Cast Iron Moldboard Shoe
- ➡ Wrap Around Curb Guard
- ➡ Carbide Cutting Edge
- ➡ Two Piece Torsion Spring Trip Cutting Edge
- ➡ Full Moldboard Trip
- ➡ Decell Heel Cylinder
- ➡ HD Moldboard
- ➡ Boxed Moldboard
- ➡ Dual Pusharms
- ➡ Rear Lift



Trip Edge

MTE Rear-Mount Wing



Distributed by:

Manufactured by:

Snow & Ice Control

A Division of Monroe Truck Equipment, Inc

1051 W. 7th Street, Monroe, WI 53566

800-880-0109

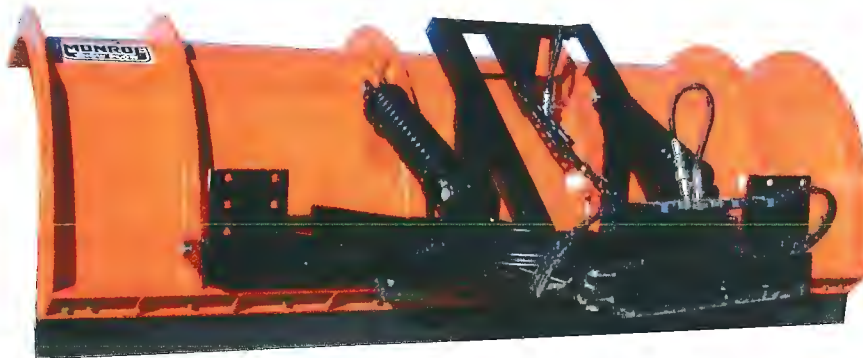
Fax: 608-328-8390

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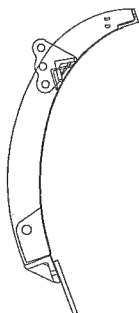
MONROE REVERSIBLE SNOWPLOW FULL TRIP MOLDBOARD



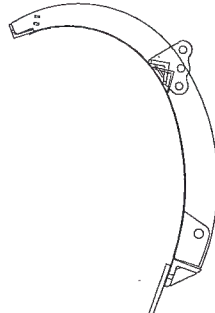
Standard Specifications:

- * 10 Gauge Roll Formed Moldboard
- * Six, 1-piece, 1/2" Flame Cut Ribs
- * Dual Compression Trip Spring Assemblies
- * Two 3" x 10" Double Acting Power Reverse Cylinders with Cushion Valve
- * Built-In Monroe Level Lift Assembly
- * Stress Proof Machined Pins
- * All Hardware Zinc Plated
- * Moldboard and Pushframe 100% Continuously Welded
- * Moldboard Painted Powder Coat Orange
- * Pushframe Painted Powder Coat Black
- * 14" Push Height
- * Available in 10', 11' & 12' Lengths

STANDARD



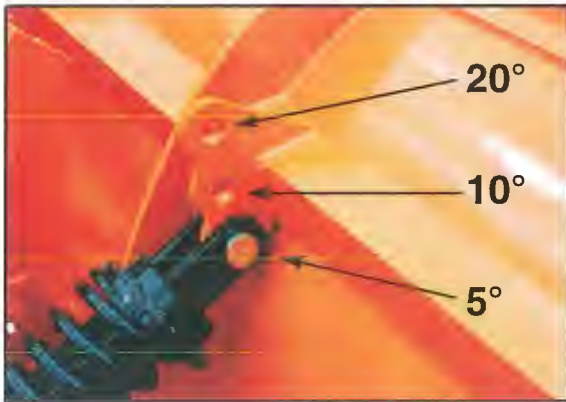
INTEGRAL



Standard Moldboard vs. 12" Extension on
Integral Shield Moldboard



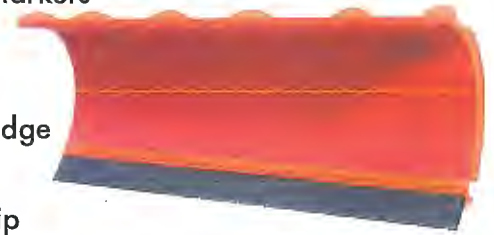
CAUTION: Plow weight, mounting distance from axle, hitch type and weight, and other additional equipment mounted on the front of a truck will require heavier truck GAWR (Gross Axle Weight Ratings). Contact chassis manufacturer for exact GAWR requirements for your specific equipment.



Simple Three Position Adjustment for Plow Cutting Edge Attack Angle

Options:

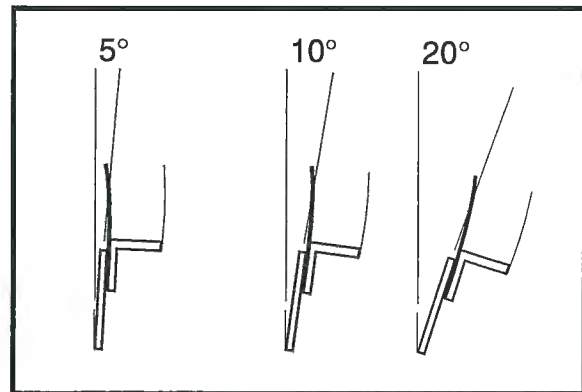
- * Rubber Snow Deflector
- * Wrap Around Curb Guards
- * Flexible Plastic or Cable Markers
- * Adjustable Parking Jack
- * Moldboard Shoes
- * 3/4" x 6" Carbide Cutting Edge
- * 4" Reversing Cylinders
- * Mechanical or Canister Trip
- * Polymer Moldboard
- * Skid Shoes, Steel Casters & Pneumatic Tires



Polymer Moldboard Shown



The Patented Level Lift allows plow to be parallel to the road surface at all times - raised, lowered, or angled.



Force Required to Trip Moldboard
 LIGHT TRIP MEDIUM TRIP HARD TRIP

THE MONROE SNOWPLOW SPECIFICATIONS

PLOW MODEL NO.	OVERALL LENGTH	HEIGHT W/ 1/2" X 8" CUTTING EDGE	NO. OF 1/2" VERTICAL RIBS	SEMI CIRCLE	MOLDBOARD BOTTOM ANGLE	MOLDBOARD TOP ANGLE	CUTTING EDGE SIZE	APPROX. WEIGHT (LBS)	MOLDBOARD THICKNESS	CUTTING WIDTH AT 35 DEGREES
MP36R10-CT	10'	36"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1475	10 GA	8'2"
MP36R10-ISCT	10'	36"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1500	10 GA	8'2"
MP36R11-CT	11'	36"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1500	10 GA	9'0"
MP36R11-ISCT	11'	36"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1525	10 GA	9'0"
MP41R10-CT	10'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1575	10 GA	8'2"
MP41R10-ISCT	10'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1575	10 GA	8'2"
MP41R11-CT	11'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1625	10 GA	9'0"
MP41R11-ISCT	11'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1650	10 GA	9'0"
MP41R12-CT	12'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1695	10 GA	9'10"
MP41R12-ISCT	12'	41"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1725	10 GA	9'10"
MP48R11-CT	11'	48"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1755	10 GA	9'0"
MP48R11-ISCT	11'	48"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1800	10 GA	9'0"
MP48R12-CT	12'	48"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	1845	10 GA	9'10"
MP48R12-ISCT	12'	48"	6	3 1/2" X 3 1/2" X 1/2"	4" X 4" X 3/4"	2" X 3" X 3/4"	3/4" X 8"	2000	10 GA	9'10"

Manufactured by:
Monroe Snow & Ice Control
 1051 W. 7th Street • Monroe, WI 53566
 800-880-0109 • 608-329-8105
 608-328-8390 Fax
 Web Site: www.monroetruck.com
 E-mail: snowandicecontrol@monroetruck.com

Distributed by:

Form REVFLOW122801

Combination Unit

Granular, Liquid Anti-Ice, De-Ice, Dust Control & Prewet



VISIT US ONLINE AT
www.monroetruck.com



Combination Liquid Anti-Ice and Granular Spreader

- 14' Corrosion-Resistant Stainless Steel V-Box
- 9.13 Yard Capacity
- 180 gallons each, 720 Total Gallons
- 3 Lane Granular Spreader
- 3 Lane Liquid Anti-Icing
- Pre-Wet (Hydraulic or Electric)
- Self Loading Skid System
- Monroe Liquid Control
- Capable of De-Icing, Pre-Wet and Spreading Granular at the Same Time
- Dust Control Optional

This is the ultimate combination unit because of the excellent weight distribution and low center of gravity.



◀ 14' V-Box with self loading leg kit, 720 gallons of liquid capacity, reversible continuous belt cross conveyor, accu-place spinner and 3-lane anti-ice boom system.

Dual auger v-box with 3-lane anti-ice, prewet and 540 gallons of liquid capacity. ▶



▶ Chassis mount, 14' v-box, 720 gallons of liquid, prewet, custom light package & 3-lane anti-ice corrosion-resistant stainless fenders, top grates, and ladder.

Distributed by:

Manufactured by:

Snow & Ice Control
A Division of Monroe Truck Equipment, Inc
1051 W. 7th Street, Monroe, WI 53566
800-880-0109
Fax: 608-328-8390
www.monroetruck.com

▶ Hook lift, dual auger v-box, 720 gallons of liquid capacity, prewet, anti-ice swing up spray bar and spinner.



Monroe Modular Design MCV V-Box



Standard Specifications:

- Modular, Bolt-On Component, Increase Product Flexibility
- 10 Gauge Hopper Shell with 45° Sloped Sides or Optional 12 ga.
- 7 Gauge Longitudinals with Bolt-On Replaceable 2' Tail Section or Optional 10ga.
- 100% Continuously Welded
- 4-Bolt Flange Relubeable Bearings
- Front and Rear Wipers
- Replaceable Chain Shields
- 3/8" Bar Flights or 1/4"
- 3/16" Replaceable Floor w/ Material Options
- 50:1 Worm Drive Gear Box
- 3/8" Rod, Heavy Duty Top Screens
- 2" Drive Shaft with 2" Spring Loaded Idler Shaft or 1 1/2" Drive Shaft with 1 1/2" Spring Loaded Idler Shaft
- Screw Adjustable Gate Jack
- 5/8" Rod Lift Loops, Bolt-On
- Side Gussets on 24" Centers
- Tip-Up Adjustable Spinner with Greasable Bearing Seal Saver installed
- Lower spinner assembly can be rotated 180° to achieve desired spread pattern.
- Powder Coated Orange or Available in 201 or 304 Stainless Steel

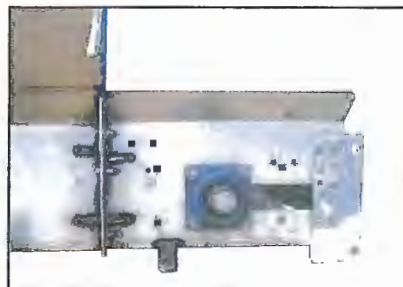


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Monroe Snow & Ice Control Spreaders Are Designed and Built to Last.....



**7 Gauge, Replaceable Chain Shields
10 Gauge Hopper
(12 Gauge Optional)**

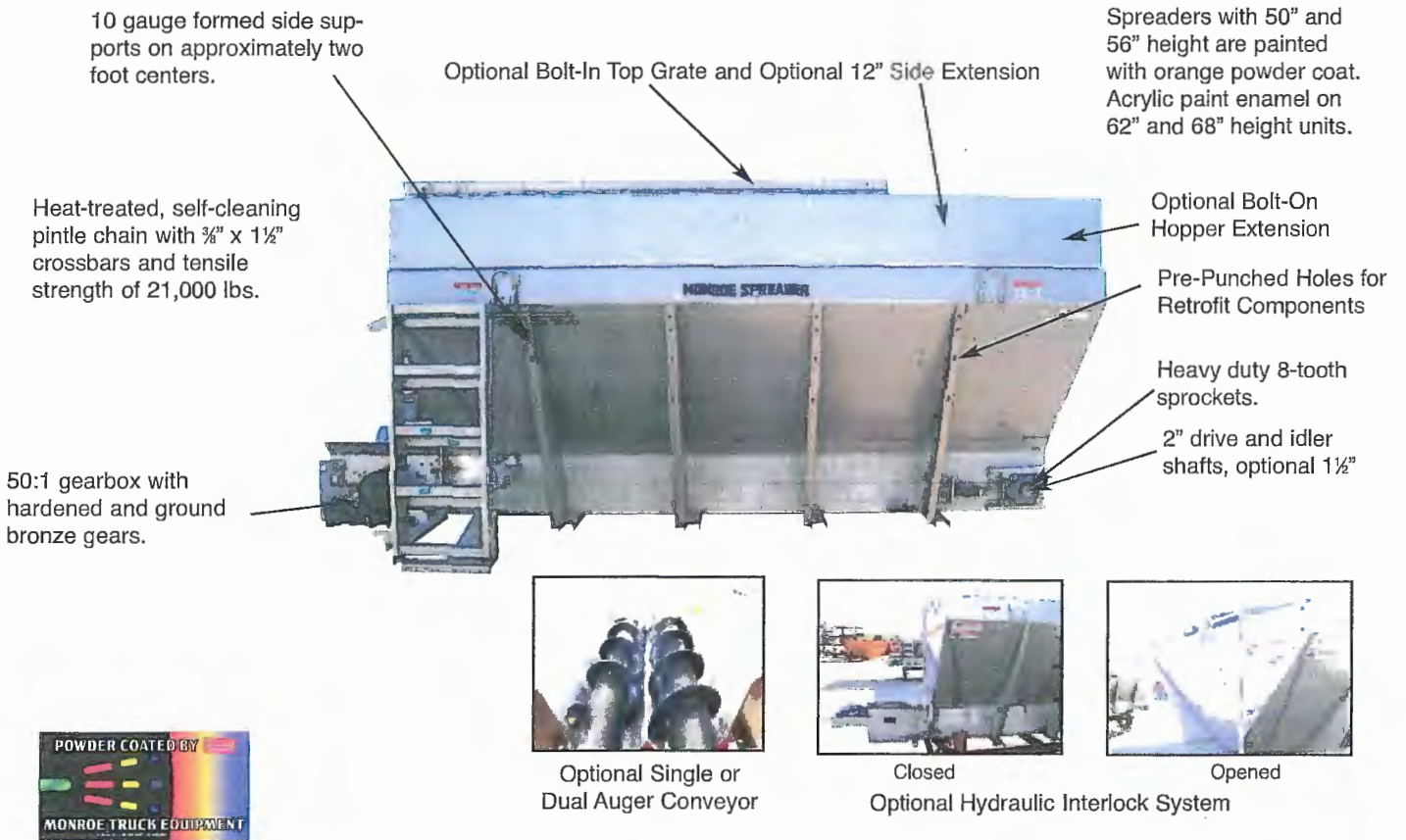


**Bolt-On Replaceable Tail
Section can be replaced if
damaged in rear end
collision**



**Standard 10 Gauge Tip-Up
Adjustable Spinner Assembly/Top
Mounted Motor with Greaseable
Seal Saver**

MCV Heavy Duty Modular V-Box Spreader



Cubic Yard Capacity-Water Level Full

Body Length

	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'
50"	4.1	4.6	5.2	5.8	6.3	6.9	7.4	8.0	8.6	9.1
56"	5.1	5.8	6.5	7.2	7.9	8.6	9.2	9.9	10.6	11.3
62"	6.1	7.0	7.8	8.6	9.4	10.2	11.0	11.9	12.7	13.5
68"	7.2	8.1	9.1	10.0	11.0	11.9	12.8	13.8	14.7	15.7

Available Options

Stainless Steel Construction
Ladders
Special Paint
Bolt-On Hopper Extension
20" UHMW Disc
Self Contained Engine
Drive Hyd. System
Chain Oiler
Bolt-On Lift Loops

Mounting Kits
Belt Over Chain Conveyor
Bolt-On Spinner Assembly
Rear Slack Adjusters
Grease Extensions
Corrosion-Resistant Stainless Steel
Inverted V
Cat Walks
25:1 Gearbox

6:1 Gearbox
Sloping Front Doghouse
Lighting Packages
Pre-Wet Systems
Skids
Leg Kits
7" Single/Dual Auger Conveyor in Lieu of Chain

Manufactured by:
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1051 W. 7th Street • Monroe, WI 53566
800-880-0109 • 608-329-8105
608-328-8390 Fax
Web Site: www.monroetruck.com
E-mail: snowandicecontrol@monroetruck.com

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F RCE[®]

INC.

INTRODUCING



SSC5100ex Spreader Control

The power behind FORCE America's 5100ex spreader control is designed specifically for the demands placed on Public Works departments and other heavy duty winter maintenance operations. The 5100ex provides a commanding solution for winter maintenance professionals to fight snow and ice with precision and simplicity. Best of all, it delivers enormous functionality within a compact, modern design to avoid crowding the cab with hardware.

Features and Benefits

A fully-integrated, all-in-one solution with a wide range of control

- Manual, open and closed loop controller options
- Accurate application of granular and liquid deicing materials
- Optional integrated control for the plow and hoist operation



Quality design and performance

- Completed rigorous environmental and shock testing as a part of the development process
- Meets the SAE J1455 standard for heavy-duty trucks
- Incorporates the same intuitive navigation found in FORCE America's 6100 line of controllers for low training and ease of moving between systems
- Proudly designed and manufactured in the USA



Integration with PreCise MRM's AVL/GPS solution for comprehensive reporting

(See reverse for more detail)

- Access to industry's most advanced web-based tool to automate winter maintenance reporting, mapping and equipment maintenance
- Total system designed to cut spending on salt and reduce impact on the environment

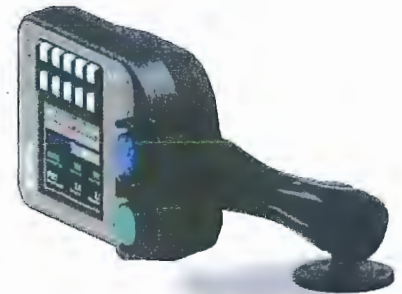
EXPERIENCE THE POWER

Compact, rugged design offers intuitive navigation and comfort

- Ergonomic design for comfortable operation
- Right-hand location of controls offer an unobstructed view of the LCD screen
- Compact design (5.1"H x 7.2"W x 2.5"D) avoids overcrowding the cab with hardware



Backlit rocker switches for easy viewing at all times.



Fully adjustable mounting option for easy, customizable installation.

Tactically placed interlock system to ensure safe use of critical functions.



Built-in USB port for data retrieval and firmware upgrades.



Bright, bold color LCD touchscreen for calibration and configuration options.



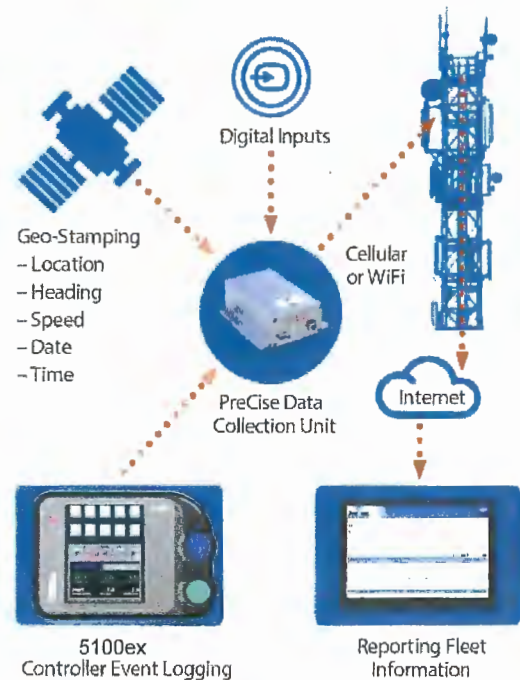
Protective casing surround control knobs to prevent unintentional use and damage to the knobs.

GPS/AVL INTEGRATION WITH PRECISE™

As a part of the FORCE America family, the PreCise Mobile Resource Management solution is integrated deeply with the 5100ex control system. Accurate material usage reporting, controller error alerts, and vehicle accessory details are all available as a part of a total system approach. PreCise MRM goes beyond AVL/GPS to provide a complete fleet management solution.

PreCise tracks and reports on:

- Vehicle speed and location
- Activity of equipment accessories, including plow and broom
- Material usage and route completion reporting
- Idle time and equipment maintenance intervals



888-99FORCE

501 East Cliff Road Burnsville, Minnesota 55337 www.forceamerica.com

Service Centers and Sales

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Part Number FA935
0413-02

Bismarck, ND	800-624-7568	Dallas, TX	800-893-7225	Milwaukee, WI	800-722-6844
Charlotte, NC	800-711-8595	Denver, CO	888-833-7711	Minneapolis, MN	800-328-2732
Chicago, IL	800-433-5766	Fort Dodge, IA	800-363-3994	Philadelphia, PA	800-492-6621
Columbus, OH	888-449-0366	Kansas City, MO	800-393-3724	Salt Lake City, UT	877-250-0505

F E A T U R E S

The Spartan SPJC® CommandAll® Controller for medium and heavy duty plow trucks is a fully proportional single-stick control with an integrated spreader control. Ergonomic design allows one-handed, finger-tip control of all spreader and hydraulic functions. The individual mini-joysticks on the handle offer superior control to push-a-button designs, and simultaneous proportional control of today's most popular functions.

- **Fully proportional controls**
 - Infinite speed control of up to seven operations simultaneously
- **Durable single-axis hall-effect main joystick**
- **Available in one, two and three mini-joystick configurations**
 - Flexibility to meet specific system needs
- **LED backlit nomenclature**
- **Programmable single-acting or dual-acting floats**
 - Float available on any joystick axis with optional three second delay
- **Integrated dash-key disconnect**
 - Completely disconnect system from battery when key switch is off
- **Joystick power-on detections**
 - Helps prevent unintended system operation
- **On-board visual diagnostics**
 - Intuitive feedback for operation and troubleshooting
- **Industry-leading safety**
 - Integrated ESTOP function shuts down joystick functions
 - Built-in deadman trigger prevents unintended operation



Additional Features

Mechanical hoist interlock - Avoid inadvertent hoist operation for operator safety. Meets hoist control regulations.

Full proportional control - Infinite speed control of up to seven operations simultaneously.

Control available in one, two, and three mini-joystick configurations - Application flexibility to meet your specific system needs.

Custom backlit nomenclatures
Safely operate all control functions in day or night conditions.

Emergency stop switch
Safety feature that immediately removes power from joystick functions.

Selectable valve drive frequency - Full Pulse Width Modulation (PWM) control with selectable drive frequency for optimum valve performance.

Solid-state protection - Self-diagnostic valve output driver automatically protects against over-current and over-temperature conditions.

Joystick power-on detection - Added safety prevent system operation when joystick activity is present at start-up.

Auxiliary switches - Control up to five auxiliary functions at 15A each.

High-flex cables - Ideal for hard to reach, seat-mounted applications.

Easy to learn, easy to use software-driven calibration - "Never Lost" Lite menu system with LiveCal allows full system calibration in minutes.

CAN Bus joystick communication - The most reliable means of sending "mission-critical" control signals.



Spartan SPJC® equipped with 2100-5100 Spreader Control Models; Thumb-Cal is a remarkable easy-to-use tool for quickly calibrating your joystick functions via our "Never Lost" Lite menu system. Scroll wheel and built-in pushbutton selection, simplify calibration.

Spartan SPJC® equipped with the cutting-edge 6100 Spreader Control Model; the joystick MIN and MAX speeds are easily calibrated on-screen via our full-feature, "Never Lost" menu system.



Electrical Specifications

Operating temperature range.....	-40° to +185°F
Operating voltage.....	10.0 to 16.0 VDC
Operating current.....	.50A max with all outputs active
Protection.....	Over-voltage, under-voltage, over-current
Valve output type.....	PWM
Valve output current.....	2.0A
Valve drive frequency.....	50 or 125 Hz
Proportional valve drive outputs.....	18
Float outputs.....	4
Blast and standby output type.....	Open collector
Dashkey input.....	12.0 VDC



501 East Cliff Road
Burnsville, MN 55337
www.forceamerica.com

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Part Number: FA920 06/27/12

Sales and Service Centers

Bismarck, ND	800-624-7568	Fort Dodge, IA	800-362-2994
Charlotte, NC	800-788-8598	Kansas City, MO	800-383-4724
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Dallas, TX	800-893-7225	Philadelphia, PA	800-492-6621
Denver, CO	888-833-7711	Salt Lake City, UT	877-230-0505

The Add-A-Fold® 2010 Valve is a multi-function valve originally designed to electrically control both cylinders and motors for light and medium duty truck applications. The modular manifold design offers optional gear pump or load sense versions, integral flow controls, and both high and low flow functions.

F E A T U R E S

- **Input Flows Up to 30 GPM**
- **Operating Pressures to 3500 PSI**
- **Section Flow Controls**
 - Control speed of each function independently
- **Optional Spin-A-Veyer® Valve**
 - On snowplows achieves precise spreader material distribution
- **Modular Sub-Base Design**
- **Level Ports, All Exit on Bottom Side**
- **Gear Pump or Load-Sensing Versions Available**
- **Optional Priority Section**
 - Ensure section operation with all flow and pressure conditions

