

**The American Road Machinery Company**  
**17 CUBIC YARD TRAILER MOUNT LEAF COLLECTOR March 2013**

**GENERAL:**

This specification describes a self-contained engine-driven vacuum leaf collecting machine. The leaf collector is trailer mounted, designed for one-person operation, and capable of picking up and completely mulching leaves from curb sides, median strips, ditches, open spillways, and other areas, then depositing the mulch in an integral 17 cubic yard all-steel hopper.

**POWER UNIT:** (Deere 4045T Tier 4 74HP)

Type:	In-Line 4 cylinder, 4-cycle, Turbo Diesel.
Displacement:	275 Cubic Inches (4.5 Liters)
Gross Power:	74 HP (55 KW) Intermittent at 2400 RPM.
Instruments:	Curb side, in shock-mounted panel. Vernier type throttle. On/Start/Off Switch. Combination Voltmeter - Tachometer - Hour Meter - Water temperature and Oil pressure with safety shut-off.
Accessories:	Gear-driven variable speed governor. Gear-driven Hydraulic Pump, 18.6 GPM at 1800 PSI.
Alternator:	72 Ampere.
Battery:	950 Cold Cranking Amps, 185 Minute Reserve.
Muffler:	Vertical, external.
Fuel Tank:	30 U.S. Gallons - High density, cross linking, non-permeating polyethylene. Molded as one piece, no weld seams or add-ons.

**RADIATOR SCREEN:**

A pleated aluminum auxiliary screen, mounted in a hinged frame, is provided, for additional protection to the radiator with no reduction of air flow.

**FAN DRIVE:**

The suction fan is direct driven by an 11-1/2" heavy duty over-center clutch through a 2-1/4" diameter straight output shaft. The fan hub is coated with anti-seize material and is positioned on the shaft by a 5/8" square by 4-1/4" long key and secured by a 1"-14 by 2" long grade 5 bolt and split 'lock' washer. The 1" bolt clamps a 1/2" by 4" flat washer to the end of the output shaft and the washer is secured to the fan hub with four 3/8"-16 by 1" socket head cap screws and split 'lock' washers. The clutch housing has a double lip seal. The clutch shaft has a sealed pilot bearing and two 2-1/4" I.D. tapered roller bearings, each with a basic rating of 3,370 pounds radial and 2,330 pounds thrust. The clutch handle is extended to provide easy access by the operator, allowing engagement and disengagement of the fan while the engine is running.

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**SUCTION FAN:**

The fan is 25" diameter, 8-1/4" wide at the tip and has a minimum of six radial blades. The fan backing plate is 1/4" thick steel and the blades are 3/8" thick AR400 abrasion resisting alloy steel with 1/8" formed reinforcing welded to the back faces. After welding, the complete fan is stress relieved for two hours at 1100 degrees F. This treatment relieves stresses induced by welding and reduces the possibility of weld failure due to shock loads. The fan produces 16,600 C.F.M. of air movement through a 16" diameter by 10' long hose under normal working conditions.

**FAN TO HOUSING EFFICIENCY:**

A high efficiency fan and housing design combines a 25" diameter fan and low fan tip clearance. This provides substantial engine horsepower reserve for picking up dense debris under adverse conditions and prevents engine stall-out. It also prevents excessive material build-up in the fan housing and produces the most efficient ratio of intake material to hopper air exhaust.

**FAN HOUSING:**

The fan housing is approximately 32-3/8" high, 34-1/4" long, and 10-1/2" wide, made of 1/4" steel plate. For added resistance to abrasive debris, the housing includes a two-piece replaceable liner made of 1/4" thick steel. To prevent worn liner sections from being drawn into the rotating fan blades, the sections are secured by ten alloy steel flat head socket cap screws and stover lock nuts. The fan housing is rigidly attached to the engine frame. To prevent severe engine and P.T.O. damage should large foreign objects be sucked into the blower housing, the back of the blower housing incorporates a safety band clamped to the P.T.O. housing, to divert shock loads to the engine frame rather than to the P.T.O. housing and engine block. Fan removal is accomplished by removing eleven bolts on the adaptor flange at the front of the housing. In order to change the fan, it is not necessary to remove the entire blower housing.

**45 DEGREE HOSE ADAPTOR:**

At the fan inlet, a 45 degree hose adapter for added hose movement and storage while keeping sealed air flow through out the suction process. Bolted design allows for easy interchangeability.

**FAN DISCHARGE:**

Discharge is directly from the fan housing to the hopper via a 10 gauge all steel welded chute. The chute has a break-away connection with a 1/4" thick top plate sealed by a half inch thick closed-cell foam rubber gasket.

**SUCTION HOSE:**

The suction hose is 16" diameter, 10' long and includes a tube, carcass, reinforcing wire, cover, and cuff. The tube is abrasion-resistant NC/SBR and the inner surface has a wax blooming rubber liner that resists wear, reduces friction, and decreases build-up of leaf material. The carcass is multi-ply woven polyester fabric. The reinforcing wire is 0.177" diameter spring steel rolled at 1-1/2" pitch for easy flexing and long life. The cover consists of black abrasive resistant neoprene over the entire outside of the hose,

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providing excellent wear and resistance to weather, oil, and ozone. Each end has straight heavy cuffs to allow bolting for strong installation. The hose weighs 7.5 pounds per foot to combine flexibility with heavy duty performance. A metal operator handle and arm assembly is provided at the intake. Pick-up is from the curb side with no interruption of normal traffic flow.

**HYDRAULIC HOSE SUPPORT:**

A 12 volt electric-hydraulic power unit provides up and down movement of the standard hose boom. This is done through a two inch cylinder that is activated with push button switches mounted in a hand held pendant which can be mounted at the operator's station. The standard hose boom is designed with two flange bearings top and bottom, bolted solid with grease fittings included, less binding or ware on the boom is accomplished. The hose support hydraulic system is independent of the hopper dump circuit.

**HOPPER AND HOPPER FRAME:**

The hopper frame is 100-3/4" wide, 99" long and made of 5" @ 9 pounds per foot channel supporting the full length and width of the hopper. The main channels are 34" wide by 98-3/4" long and are welded to the cross channels in such a way as to maintain a 5" overall height. The hopper and frame assembly form a unitized structure. The hopper dimensions are 101" wide, 99" long, and 80" high, creating a capacity of 17 cubic yards. This hopper capacity is achieved without an excessive front hopper extension.

The hopper is made from 12 gauge sheet steel all welded construction with three supporting ribs of 3" structural channel encircling the hopper for strength. The inside of the hopper is smooth for ease of dumping a fully packed load. The top of the hopper has three slide-in filter screens in three framed steel sections reinforced with 1-1/2" expanded metal. The replaceable aluminum mesh screen is bolted to the screen frames.

The hopper assembly is attached to the main frame by a 3/8" thick steel plate hinge assembly which is formed, bushed, and welded to the rear of the hopper frame. This hinge assembly attaches to the main frame with a 1-1/2" diameter by 39" long steel pin.

**REAR DOORS:**

Units are available with either a single one piece top hinged rear door or dual side hinged rear doors.

**Top Hinged Door:**

The hopper has a one-piece top hinged rear door with spring-compensated counter-balance to aid in holding the door open for dumping. The door is made of 12 gauge sheet steel, formed at a 45 degree angle, 8-1/2" from the top and bottom edges. The inside of the door is reinforced on all sides, creating a unitized box around the perimeter of the door. The top and bottom reinforcing angles are 7" by 7" by 12 gauge and the side reinforcing angles are 3" by 3" by 3/16". The door hinges are 1/4" steel and incorporate a connecting eye for the counter balance springs. The springs are 3" in diameter with a 24" free length, made from 0.4" diameter wire, and positioned 3" above the top of the hopper. Each spring generates a 460 pound load when extended 10" and

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800 pounds when extended 18". Each spring has a tension adjustment of 9" at the hopper end of the spring connection. Plates of 3/16" steel are welded to the bottom of the door to create a positive, easy operated door lock.

**Dual Side Hinged Rear Doors:**

Two piece heavy duty side hinged overlapping rear doors that open with ease and can be locked into place while dumping. Each door opens 270 degrees and is securely held in place by 3 welded custom hinges. The rear doors open and close via dual cam type lock rods with keeper locks to create a strong, tight fit. Each door is fabricated using 3/16 inch flat sheet steel framed by 1-1/2" x 3" x 1/8" thick square tubing.

**HYDRAULIC SYSTEM:**

The leaf collector has an independent hydraulic pump driven by the engine (not electric driven) to power the hopper dump cylinder. The hopper is self dumping, using a 4" diameter two-stage hydraulic cylinder with a capacity of 28,000 pounds, applied directly upward at the front of the hopper. This front mounted cylinder provides a positive mechanical advantage which permits smaller diameter cylinders at lower operating pressure, compared to high pressure, negative mechanical scissor type hoists. The hydraulic system includes an oil tank, valve for operating the hopper dump cylinder, hydraulic hoses, and all connections.

**TRAILER FRAME:**

The leaf collector overall size is 101" wide, 265" long and 118" high. The main frame is 34" wide and 222" long, made of 6" x 2" x 5/16" wall rectangular tubing and 6" @ 10.5 pounds per foot steel channel. A 6" OD, 2-3/4" ID by 1-5/8" wire forged lunette eye is welded and gusseted to a 3/4" by 6" by 9" plate. The eye and plate are attached by four 1" diameter grade 8 bolts to a 3/4" by 9" by 14" plate welded and gusseted to the 6" x 4" x 1/2" wall rectangular tube tongue. The plate incorporates eight 1-1/16" diameter holes on 4" centers to adjust for different towing vehicles.

A 12,000 lb. static, 10,000 lb. lift capacity, 4" square, drop leg, side crank jack is bolted to the trailer frame tongue as a parking stand. The trailer has chains with safety hooks for towing.

**TANDEM AXLE SUSPENSION AND BRAKES:**

The trailer has two 3" diameter tubular alloy steel axles rated at 7,000 pounds each; four slipper leaf spring assemblies rated at 3,500 pounds each, swivel equalizers between the axles, and "EZ Lube" hubs. Four 8.00-14.5 LT tires have a 72" track.

Axles, springs, and tires are attached to a bogie sub-frame which is bolted to the trailer frame. The sub-frame is fabricated of rectangular 3/16" wall steel tube and is 70" long by 57-1/2" wide. There are two supporting cross channels of 6" @ 8.2 pounds per foot structural steel. The tire center line does not exceed the center line of the supporting springs by more than 10", thus distributing the weight of the hopper and contents.

The leaf collecting unit has electrically operated brakes on both axles, controlled from the towing vehicle with a plug connector between the trailer frame and the towing vehicle. The unit is equipped with an electronic brake control that requires no hydraulic

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connection to the towing unit and a break-away safety switch which will apply the brakes on all wheels in the event the towing vehicle and leaf collector become separated.

**LIGHTS:**

The unit is equipped with LED lights and reflectors in accordance with Federal Motor Vehicle Safety Standards.

**SAFETY PACKAGE:**

Conspicuity Tape located on the side of unit and at the top rear, designed to meet trailer safety requirements. Safety bumper is mounted at rear of unit; approximately 19 inches off ground (depending on axle choice) with stop and turn lights mounted in bumper. Bumper is made of 6 X 3 X 1/8 inch wall, 90 inches wide gusseted and capped for strength and rigidity.

**PAINT:**

The hopper, engine cover, and fan housing are thoroughly cleaned and given two coats of rust inhibiting primer and two coats of white finish. The trailer frame and axles are similarly primed, and finished in black.

**DEVIATIONS:**

Bidders must offer a regularly-manufactured machine and supply descriptive literature and complete specifications. All deviations from and exceptions to this specification must be completely explained and included with the bid. Otherwise the purchasing authority will assume the proposed machine to be exactly as described above and, after delivery, may return the machine for noncompliance with the specifications.

**OPTIONAL EQUIPMENT**

**HINGED HOSE ADAPTOR:**

At the fan inlet, a hinged hose adaptor is provided, to allow storage of the suction hose for transport.

**TOP OR BOTTOM MOUNTED LED STROBE PACKAGE:**

Two top or bottom mounted (2 total) yellow safety strobe lights. The top mounted lights are recessed in 12 gauge steel protection box angled to deflect trees and branches. The bottom lights are recess mounted in the bottom side of the hopper for safety and security. The lights are wired to the key standard or to a separate on of switch if requested.

**TOP AND BOTTOM MOUNTED LED STROBE PACKAGE:**

Two top and two bottom (4 total) mounted yellow safety strobe lights. These are the same as above; both sets are mounted on the rear of the unit.

**WARNING BEACON:**

A 360 degree amber rotating beacon is installed on the hopper so that it is visible from the sides and rear of the unit and wired to operate when the engine is running.

**HOSE QUICK DISCONNECT:**

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The suction hose is connected to the blower housing adaptor without the use of bolts or wing nuts. The Quick Disconnect device includes a flange on the end of the suction hose, a split ring attached to the blower housing, and an over-center clamp for locking the split ring over the hose flange. A safety cover is also provided, for use when the suction hose is removed. The safety cover is similarly retained by the split ring and over-center clamp.

**FLUID COUPLER:**

The suction fan is direct driven by a heavy duty fluid coupler through a 2 1/4" diameter straight output shaft. The fan hub is coated with anti-seize material and is positioned on the shaft by a 5/8" square by 4-1/4" long key and secured by a 1"-14 by 2" long grade 5 bolt and split 'lock' washer. The 1" bolt clamps a 1/2" by 4" flat washer to the end of output shaft and the washer is secured to the fan hub with four 3/8"-16 by 1" socket head cap screws and split 'lock' washers. The housing has a double lip seal. The fluid coupler has a sealed pilot bearing and heavy duty roller bearings. The fluid coupler provides smooth engagement as the engine RPM is increased from idle and disengages when the engine RPM is returned to idle. This eliminates clutch wear and damage done by high RPM engagement that can occur with any clutch type PTO.

**FOUR-WAY HYDRAULIC HOSE BOOM:**

The hose support boom has two flange bearings top and bottom and attaches to an all steel formed and reinforced bracket which is bolted to the fan housing, allowing dumping of the hopper without disconnecting the hose. The horizontal arms are 4" x 1-1/2" "structural rectangular tubing with a 1/8" thick wall with a welded end cap. The boom assembly shall be capable of moving up and down, left and right. The boom shall be controlled by an in cab joystick, or wireless handheld pendent, that allows the operator to control the hose movement, the engine RPM, and kill the engine in case of an emergency. The boom's hydraulic source shall be the leaf collector engine through a gear driven hydraulic pump. There shall be a flow control valve which controls the hydraulic oil flow to the boom control valve. The boom shall have two double acting hydraulic cylinders that facilitate its movements. The Two hydraulic cylinders are 2" diameter x 10" stroke.

**SIX-WAY HYDRAULIC HOSE BOOM**

The hose support boom has two flange bearings top and bottom and attaches to an all steel formed and reinforced bracket which is bolted to the fan housing, allowing dumping of the hopper without disconnecting the hose. The horizontal arms are 4" x 1-1/2" "structural rectangular tubing with a 1/8" thick wall. The boom assembly shall be capable of moving up and down, left and right, and the end of the hose in and out. The boom shall be controlled by an in cab joystick, or wireless pendent that allows the operator to control the hose movement, the engine RPM, and kill the engine in case of an emergency. The boom's hydraulic source shall be the leaf collector engine through a gear driven hydraulic pump. There shall be a flow control valve which controls the hydraulic oil flow to the boom control valve. The boom shall have three double acting hydraulic cylinders that facilitate its movements. Two 2" diameter x 10" and one 2" diameter x 6" stroke.

**Available Optional Engine Selections**

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**POWER UNIT:** (Deere 4045TFTIII - 85)

Type: In-Line 4-cylinder, 4-cycle, Turbo Diesel.  
Displacement: 276 Cubic Inches (4.5 Liters)  
Gross Power: 85 HP (60 kW) Intermittent at 2500 RPM.

Instruments: Curb side, in shock-mounted panel.  
Electronic type throttle.  
On/Start/Off Switch.  
Digital Combination Voltmeter - Tachometer - Hour  
Meter - Water temperature and Oil pressure with  
safety shut-off. LED indicator lights.

Accessories: Gear-driven variable speed governor.  
Gear-driven Hydraulic Pump, 18.6 GPM at 1800 PSI.

Alternator: 65 Ampere.

Battery: 950 Cold Cranking Amps, 185 Minute Reserve.

Muffler: Vertical, external.

Fuel Tank: 30 U.S. Gallons - High density, cross linking, non-  
permeating polyethylene. Molded as one piece, no  
weld seams or add-ons.

**POWER UNIT:** (Deere 4045TFTIII - 99)

Type: In-Line 4-cylinder, 4-cycle, Turbo Diesel.  
Displacement: 276 Cubic Inches (4.5 Liters)  
Gross Power: 99 HP (74 kW) Intermittent at 2400 RPM.

Instruments: Curb side, in shock-mounted panel.  
Electronic type throttle.  
On/Start/Off Switch.  
Digital Combination Voltmeter - Tachometer - Hour  
Meter - Water temperature and Oil pressure with  
safety shut-off. LED indicator lights.

Accessories: Gear-driven variable speed governor.  
Gear-driven Hydraulic Pump, 18.6 GPM at 1800 PSI.

Alternator: 70 Ampere.

Battery: 950 Cold Cranking Amps, 185 Minute Reserve.

Muffler: Vertical, external.

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Fuel Tank: 30 U.S. Gallons - High density, cross linking, non-permeating polyethylene. Molded as one piece, no weld seams or add-ons.

**POWER UNIT:** (Deere 5030HFTIII - 99)

Type: In-Line 5-cylinder, 4-cycle, Turbo After Cooled Diesel.  
Displacement: 186 Cubic Inches (3 Liters)  
Gross Power: 99 HP (77 kW) Intermittent at 2500 RPM.

Instruments: Curb side, in shock-mounted panel.  
Electronic type throttle.  
On/Start/Off Switch.  
Digital Combination Voltmeter - Tachometer - Hour Meter - Water temperature and Oil pressure with safety shut-off. LED indicator lights

Accessories: Gear-driven variable speed governor.  
Gear-driven Hydraulic Pump, 18.6 GPM at 1800 PSI.

Alternator: 70 Ampere.

Battery: 950 Cold Cranking Amps, 185 Minute Reserve.

Muffler: Vertical, external.

Fuel Tank: 30 U.S. Gallons - High density, cross linking, non-permeating polyethylene. Molded as one piece, no weld seams or add-ons.

***Municipal Equipment Sales, Inc.***

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