



TECHNICAL SPECIFICATIONS

MIDWEST International

VACUPAC™ I SERIES

ENCLOSED VEHICLE LOADING SPOUT

TO 1400TPH

MIA 36-EV/ES

TECHNICAL SPECIFICATIONS

VACUPAC™ I SERIES

INTEGRAL LOADING SPOUT AND FILTER MODULE

DESIGN CRITERIA: The equipment described in this technical specification is designed to load dry dusty bulk products into enclosed vehicles and will reduce or eliminate dust in compliance with most federal and local EPA regulations without the use of an external dust collector or complex dust piping. This equipment is considered by most agencies to be the best available technology in terms of dust control however, this series must be applied properly as filter area is limited.

DESCRIPTION: The **MIDWEST Vacupac™** I Retractable Bulk Loading Spout with **Vacupac™** I integral filter module, clean air fan and compressed air filter purging system is designed to load dry dusty bulk cargo, such as petrochemical resins and agricultural products, into enclosed trucks and/or railcars and will accept cargo through a top flanged inlet from a screw conveyor, belt conveyor, drag conveyor or direct silo or bin withdrawal. The spout has its own reversible electric motor to extend or retract the lower spout discharge. The spout vertical travel is sized to reach the lowest hatch of a vehicle. Dust and displaced air is withdrawn through the annular area between the product column and the **Rhinoflex™** Flexible Outer Spout and into the **Vacupac™** I filter area where dust particles are trapped on the filter media. Dust is automatically purged off and falls into the vehicle being loaded and again becomes cargo. This system must be sized to place the spout and the vehicle being loaded under a negative pressure or vacuum as recommended by **MIDWEST** and with an air to cloth ratio (fan capacity vs. filter media area) acceptable for the product being loaded. Consult factory for assistance.

MODEL **MA36** - EV **VACUPAC™** I ENCLOSED VEHICLE AND VESSEL LOADER

MAIN PAN: Standard construction ASTM A 36 carbon steel .25"(1/4") thick all welded box construction with top hinged access door over drive components. Additional (2) hinged access doors are also provided on sides of main pan to inspect lifting cables and slack cable limit switches. Class IIIA all stainless steel construction available. (Specify 304 or 316) Note: Refer to classes of construction available.

PRODUCT INLET: Flanged 18" diameter with (8) 3/8" diameter x 1" studs or 18"x18" square inlet allows loader to be bolted to a **MIDWEST** sliding knife gate or withdrawal valve for silo withdrawal or **Multiflo™** Screw Conveyor discharge or shiploading boom.

DRIVE: Electric motor drive winch with totally enclosed motor and gear reducer mounted under the main pan for weather protection. 1.0, 1.5, 2, and 3 HP motors are used depending upon length of travel and class of construction. A rotating NEMA 4 up/down SPDT (2) position limit switch protects the gear reducer from damage by shutting off the motor at full up or down position. **This switch must be adjusted in the field after installation and before operation begins.** The **MIDWEST** gear reducer and drive components are not covered by warranty until both up and down adjustments have been completed according to the **MIDWEST** Instruction Manual. Cable lifting pulleys are precision machined cast ductile steel and are keyed to the reducer shaft with machined steel coupling. A (3) point

1/4" diameter cable lifting system on all **MD/V/A 36's** provides a robust lifting winch. Machined lifting bolts on lift ring are provided for final leveling of the spout. The drive access door on top of retractable spout main pan serves as a maintenance access to all drive components. Cable transfer sheaves are machined steel, oil impregnated bronze brushed, and have keepers to prevent the lifting cables from snarling. Four (4) leveling support lugs are provided on top of main pan for leveling and supporting the main pan during installation. NOTE: Main pan and lower spout lift ring must be level for proper operation.

***PRODUCT VENTURI:** The **MIDWEST** Venturi is sized to load a maximum of 1400 STPH of 60 PCF product (free flowing fines). For throughput capacities other than 1400 STPH, refer to the next larger loading spout or consult the factory. Capacities are based on a consistent feed rate and entry free fall velocity of product into the spout of a minimum of 12 ft/sec. When fully filled with product the Venturi forms the product into a controlled column reducing dust caused by column acceleration. For specifications on classes of construction, refer to next page.

VERTICAL USEFUL TRAVEL: 6 feet to 45 feet standard travels available in 2' increments. Consult factory for travels other than standard.

FLEXIBLE OUTER SPOUT: The **MIDWEST Rhinoflex™** Flexible Outer Spout is constructed of 17 oz. white cross stitched coated polyester fabric (176° F max. to -45° F min.) which is double lock stitched. 6061-T6 extruded aluminum outer rings and half round 6061-T6 extruded aluminum inner rings are riveted together for strength compressing the fabric into a concave area on the back side of the outer ring. Refer to classes of construction for temperature ratings to 1000° F. **MIDWEST** aluminum extrusions have rounded edges to avoid shearing of fabric. Top ring is secured to filter module with aluminum draw band and bottom rings are secured to the lower lifting ring with (4) 3/8 NC lock bolts. All **MIDWEST Rhinoflex™** Flexible Outer Spouts include one (1)1/8" diameter stainless steel grounding cable riveted to each aluminum outer ring.

CAUTION: Each end of the grounding cable includes a lug which must be firmly secured to the lifting ring and the upper main pan to insure electrical continuity and to dissipate static electricity.

VACUPAC™ I FILTER MODULE: ASTM A36 carbon steel standard, Class III and IIIA optional construction available. Clean air fan and sequential compressed air purging system prewired and prepiped to a single point, 1" NPT pneumatic connection is included. Pleated filter cartridges are standard in this series **Vaculoader®** which results in low air to cloth ratios. Filter cartridges are "V" pleat **Polyflex™** spun bond as standard, other media available including Nomex, Gortex, or Teflon coated filters. Metal filter parts are galvanized or optional stainless steel (specify). Consult factory for other media.

LIFTING RING: Cast machined unpainted aluminum alloy (3) piece lifting ring with mounting pads for accessories and bolt holes for lower scavenger. Consult factory for available alternate materials of construction. Lifting system is robust (3) point pickup suitable for rotating trimming spoon (vessel loading applications).

OUTER SCAVENGER: The **MIDWEST** Outer Scavenger is flanged to connect to the bottom of the lifting ring with (4) 3/8 NC bolts. Class I Scavengers are constructed of abrasive resistant low density cross link white polymer. Other outer scavengers are available, including Class IA fabricated from A36 carbon steel, Class IB, non sparking aluminum and Class III, fabricated from 316L or 304 stainless steel. Specify class of construction when ordering.

INNER CONES: **MIDWEST** inner cones are used for column control. Abrasive resistant cones are available and are attached with 1/8"x 2" flat nylon straps installed approximately 120 degrees apart, or with 3/16" or 1/4" diameter wire rope and clamps, depending upon the materials of construction ordered. These cones control the product column the full length of travel with the lower cone firmly secured inside cast lifting ring. Specify Class I, IA, IB, II, III, and V. (Refer to chart below.)

CLEAN AIR FAN: Available in air withdrawal capacities of 100, 300, 500, 600, 800, and 1000 CFM. Cast aluminum alloy fan housing standard, includes direct drive motor with static and dynamically balanced cast aluminum machined impeller. Fan motors are 3450 RPM standard TEFC enclosures with mill and chemical duty, and 1750 RPM and (XP) motors available. NOTE: Fan rotation must be correct or efficiency will drop by 60 percent. Arrow on fan indicates proper rotation.

FILTER PURGING SYSTEM: Automatic sequential filter purging system includes factory adjusted timed compressed air sequential purging of filters and pressure differential gauge is standard. Heavy duty NEMA 4 purging valves and air accumulator included. Purging system wired to not purge if **Paragon™** Series loading spout discharge is not firmly seated in vehicle hatch. This feature allows fan to remain on between vehicle spotting. NOTE: Applies to **Paragon™ MV** Series loading spouts with slack cable limit switches. Air purging system prepped and prewired as standard. Purging air must be dry instrument air with no moisture. Contact factory for **explosion proof (XP) electrics**. NOTE: **Photohelic™** filter P/D system available as an option.

CAUTION: Class I polymer cones may require a grounding cable to reduce the possibility of static charges in a hazardous area. Consult factory for details.

CLASSES OF CONSTRUCTION AVAILABLE:

Class I	Abrasive Fines (High-density AR cross-linked polymer) to 176° F and -40° F
Class I (FG)	Abrasive Fines (Same as Class I except White Food Grade)
Class I A	Mildly Abrasive Granules (A36 carbon steel)
Class I B	Contamination Free Fines and Pellets (6061 T6 non sparking aluminum)
Class II	Abrasive Granules (250 BHN AR steel)
Class III	Stainless Steel Product Flow Area only (304 furnished as standard, 316 available)
Class III (FG)	Food Grade Products (Same as class III with ground and polished welds.)
Class III A	Stainless Steel all Fabricated Metal Components (304 furnished as standard, 316L available)
Class III A (FG)	Corrosive or Non-Contaminate Environment (Same as Class III A with stainless steel fastings)
Class IV A	High Temperature 177° F to 400° F
Class IV B	High Temperature to 1000° F

Class V	Abrasive Lumps High Impact (400 BHN AR steel)
Class V A	Abrasive Lumps High Impact (400 BHN AR steel Venturi, with integral rockbox to reduce wear)
Class V T	Abrasive Lumps High Impact (Triten™ Hard Coat)

PAINT: Mechanical cleaned with (3) mils white two part epoxy standard. Consult factory for optional paint systems.

ASSEMBLY: **MA 36-EV** Bulk Loading Spout with **Vacupac™** filter modules are factory assembled prior to shipment. Consult factory for module stackup drawings and drawings for other **MA** internally vented loading spouts.

ESTIMATED MECHANICAL FIELD ERECTION: Four (4) hours for units shipped completely assembled, excluding dust piping.

ESTIMATED ELECTRICAL FIELD WIRING: One (1) hour with power available within 7 feet and factory prewiring is purchased.

FIELD SUPERVISION: Erection and/or start up assistance by **MIDWEST** is available at a per diem cost. Consult factory for prices.

INSTRUCTION MANUALS: **MIDWEST** provides two (2) Installation, Operating and Maintenance Manuals one shipped with equipment and one forwarded to the purchasing department at time of shipment. Additional copies can be purchased at additional cost.

CAUTION: Many dry bulk products contain explosive dust. **MIDWEST** offers explosion proof (XP) electrics as an option for all electrical components and PLC controls. Intrinsically safe barriers are also available for hazardous areas. Consult factory for additional information and pricing.

OPTIONS AVAILABLE:

PREWIRING/PREPIPING: Purging valves and prewiring of purging controller included as standard. Optional prewiring of pneumatic vibrators, bulk loading spout rotating limit switch including other accessories is available.

MOTOR PREWIRING: **MIDWEST** can prewire **Vacupac™** I fan motor and loading spout drive motor to an independent NEMA 4X or (XP) junction box.

MOTOR CONTROLS,(MCC): Electric motor starter(s) can be provided for the **Vacupac™** I fan, the **Paragon™** Series Retractable Bulk Loading Spout motor and product trimmer electric motor if applicable. NEMA 4 or 4X enclosures standard, NEMA 7/9 (XP) available.

INLET PIVOT GIMBAL: (Vessel loaders only) Allows spout to suspend vertically if shiploader boom lifts up and down.

PRODUCT TRIMMING SPOON: (Vessel loaders only) Allows pneumatic, hydraulic or electric spoon rotation to allow for trimming of load. Normal trajectory is approximately 6 to 8 feet. Available with "tilt to park" feature in place of removal of complete trimmer.

ACCESSORIES:

NOTE: Accessory items are shipped in kit form to be field installed however, are factory installed if **MIDWEST** prewiring option is purchased.

LIMIT SWITCH, THIRD INTERMEDIATE POSITION: Provides an intermediate set point to shut down product feed or provide an intermediate electrical signal. Example: A short height above vehicle hatch when frequent loading is common. This allows spout to not be fully retracted after each vehicle has been loaded to reduce time to raise and lower.

SLACK CABLE LIMIT SWITCH KIT: Available for loading enclosed vehicles when spout enclosed vehicle scavenger makes contact with the rim of an enclosed vehicle hatch or side of an open truck. This option includes (2) NEMA 4 DPDT lever limit switches which shut off drive motor when contact is made by either switch. Temperature range, (230°F max. to -40°F min.). Refer to MAIN PAN construction with (2) hinged side access doors for lift cable and limit switch inspection.

AUTOMATIC LEVEL SENSING KIT: Used to provide a signal to the loading operator that the vehicle is full, or can be used to automatically shut off the feed supply gate, valve, air gravity conveyor, or to place the withdrawal valve in a "JOG" mode for topping off vehicle. Available with a Type "A" tilt probe, Type "B" pressure switch, Type "C" capacitance probe, or Type "D" infrared sensor. A NEMA 4X controller is included with green "Normal" and red "High Level or Full" indicator light and (2) position "on - off" selector switch. The controller is normally shipped loose for field installation but can be installed on the spout main pan assembly at additional cost. Refer to prewiring options.

COMBINATION AUTOMATIC RAISING-LEVEL SENSING KIT: When loading both enclosed and open vehicles with product, an (EV) Enclosed Vehicle tapered scavenger is used. The Combination Automatic Raising-Level Sensing Kit will allow the loadout operator to select the sensing probe mode, i.e; to sense the level of product in an enclosed vehicle or container as it becomes full or when the automatic raising

mode is selected, the spout retracting drive will automatically retract the spout as the product contacts the probe. A NEMA 4X controller is included with green "Normal"(non raising), amber "Raising", and red "High Level or Full" indicator lights and (2) position selector switch "open vehicle"- "enclosed vehicle". The controller is normally shipped loose for field installation but can be pre-installed on the spout main pan assembly at additional cost. Refer to prewiring option. When using this accessory for both enclosed and open vehicles an 18" long (OV) flexible outer skirt is available; consult factory for pricing.

FILTER REGULATOR(PURGE): Includes 1.0 NPT maintenance valve and combination air filter regulator.

AIR VIBRATOR KIT: Two (2) piston type air vibrators can be located on lower lifting ring to vibrate loose product from inside of spout after loading. Vibrators are controlled by a 120 VAC or 240 VAC NEMA 4X solenoid valve located on the main pan. Vibrators and solenoid valve are connected by a flexible air line festooned down the back of the Rhinoflex™ Flexible Outer Spout. Air supply and field connection to valve are the customer's responsibilities. Plant air consumption 6 CFM @ 45/100 PSI.

FILTER REGULATOR LUBRICATOR (VIBRATORS): Includes .5 (1/2") NPT maintenance valve with lock out feature.

HATCH ADAPTOR: To accommodate larger truck or railcar hatches. Standard sizes 42" square or 36" round. Consult factory for details and other sizes. Specify class of construction, Class IA, IB, III, or IIIA available.

OPERATOR CONTROLS AND MOTOR CONTROLS (MCC): Available for all models. Refer to MIDWEST Electrical Options. Consult factory for pricing.

Technical specifications are subject to change without prior notification



EQUIPMENT INDICATED IN SOLID COLOR IS INCLUDED IN THIS TECHNICAL SPECIFICATION.

EQUIPMENT OUTLINED IS AVAILABLE. CONSULT MIDWEST FOR

MIDWEST International
Midwest Plaza
105 Stover Road
Charlevoix Michigan 49720-0438
USA
Phone: (231) 547-4000
Fax: (231) 547-9453
International Fax: (231)547-0269
Web Site: www.midwestmagic.com
"e" mail: midwest@freeway.net



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TECHNICAL DATA

MA36-EV PARAGON™ SERIES

LOADING SPOUT AND VACUPAC™ I FILTER MODULE

Loading Capacities

PRODUCT	TEMP (F/C)	DENSITY (PCF)	LOAD RATE STPH	MTPH

SCREEN ANALYSIS

% IN/MM % IN/MM

MA36 EV Bulk Loading Spout

	VERTICAL TRAVEL	RETRACTED HEIGHT	WEIGHT CLASS I	WEIGHT IA,II,IV,V
<input type="checkbox"/>	06' (1.8)	38" (.97)	1145 (520)	1235 (561)
<input type="checkbox"/>	08' (2.5)	41" (1.04)	1210 (550)	1360 (618)
<input type="checkbox"/>	10' (3.0)	44" (1.12)	1250 (568)	1430 (650)
<input type="checkbox"/>	12' (3.5)	48" (1.22)	1305 (594)	1515 (689)
<input type="checkbox"/>	14' (4.2)	51" (1.30)	1340 (609)	1585 (720)
<input type="checkbox"/>	16' (4.8)	53" (1.35)	1385 (630)	1655 (752)
<input type="checkbox"/>	18' (5.5)	57" (1.45)	1425 (648)	1725 (784)
<input type="checkbox"/>	20' (6.0)	60" (1.52)	1465 (666)	1795 (816)
<input type="checkbox"/>	25' (6.0)	70" (1.78)	1590 (723)	2010 (914)
<input type="checkbox"/>	30' (6.0)	76" (1.93)	1705 (775)	2215 (1007)
<input type="checkbox"/>	35' (10.7)	86" (2.18)	1830 (832)	2430 (1105)
<input type="checkbox"/>	40' (12.2)	92" (2.34)	1945 (884)	2635 (1198)
<input type="checkbox"/>	45' (13.7)			
<input type="checkbox"/>	OTHER			

Classes of Construction Available: Refer to Technical Specification MA36 EV, Form No. 1357

Drive Winch Data, Loading Spout

- 1/4" (6.35) or 3/8" (9.52) diameter lift cables, as applicable (3) point pickup 14 FPM lifting velocity (Average)
- 1.0 (1) HP Brake Motor, TEFC Enclosure, 1750 RPM. Reducer 162:1 ratio 5,951 IN/LBS Torque, Safety Factor
 - 2.0 (2) HP Brake Motor, TEFC Enclosure, 1750 RPM. Reducer 267:1 ratio 19,700 IN/LBS Torque, Safety Factor
 - 3.0 (3) HP Brake Motor, TEFC Enclosure, 1750 RPM. Reducer 250/34:1 ratio 27,417 IN/LBS Torque, Safety Factor
 - Special or (NSP)

Accessories, Loading Spout

- Limit Switch, Third Intermediate Position
- Slack Cable Limit Switch Kit: DPDT NEMA 4 Standard
- Automatic Level Sensing Kit: NEMA Type VAC
- Air Vibrator Kit: (6 CFM, 45/80 PSI Required) NEMA Solenoid Valve VAC
- Pneumatic Filter, Regulator, Lubricator NPT (Vibrators)
- Combination Automatic Raising/Level Sensing Kit: NEMA Type
- Hatch Adaptor: Square Round Class
- Operator Controls: NEMA IP
- Motor Controls: NEMA IP
- Special Paint:

Options, Loading Spout

- Drive Motor: Mill and Chemical Duty
- Explosion Proof (XP) Electrics, NEMA
- Accessory Prewiring, NEMA
- Motor Prewire: Motor(s)
- Intrinsically Safe Barrier (For XP Controls)

NOTE: All standard fastenings are zinc plated to resist surface rust. Stainless steel and grade 8 high strength fastenings are available. Standard loading spout lift rings are cast 6061T6 machined aluminum alloy and are unpainted. Cast malleable steel (painted) and cast stainless steel available. Contact factory for (NSP) cost.

Important

Loading capacities are based on product bulk density of 60 PCF fines and 12 FT/SEC vertical entry velocity. Variations in density and lump size will affect loading capacity. Variations in entry velocity and trajectories other than vertical product entry could cause premature wear in product flow areas. Midwest recommendations for classes of construction are based on product samples supplied. Midwest loading spouts are designed to load product only in the plumb (vertical) position. Consult Midwest for horizontal spout positioners available.

Vacupac™ I Filter Module Polyflex™ wide "V" pleat (standard)

	MODEL	STANDARD MEDIA AREA	MEDIA (1.5)	OPTIONS (2.0)	CFM	NET WEIGHT WITHOUT FAN
<input type="checkbox"/>	MA36 - 18	171	252	342	<input type="text"/>	231 LBS. (105) KG.
<input type="checkbox"/>	MA36 - 24	228	336	456	<input type="text"/>	261 LBS. (118) KG.
<input type="checkbox"/>	MA36 - 30	285	420	570	<input type="text"/>	292 LBS. (132) KG.
<input type="checkbox"/>	MA36 - 36	342	504	684	<input type="text"/>	322 LBS. (146) KG.
<input type="checkbox"/>	MA36 - 42	399	588	798	<input type="text"/>	353 LBS. (160) KG.
<input type="checkbox"/>	MA36 - 48	456	672	912	<input type="text"/>	383 LBS. (174) KG.

Accessories, Vacupac™ I Filter Module

- Pneumatic Maintenance Valve with Lock Out Feature, Filter Regulator. (Purge) 1.0 IN. NPT

Options, Vacupac™ I Filter Module

- Prepipe "A" Purging System, Filter Regulator
- Motor Prewiring: NEMA For Motors
- Motor Controls (MCC) NEMA
- Fan, Clean Air: HP, Volts , 3 Phase RPM CFM RPM
- Intrinsically Safe Barrier (For NEMA 7/9 XP 120V or 220V ! Phase Applications) Barriers
- Explosion Proof (XP) Electrics (Fan Motor), Spout Motor
- Explosion Proof (XP) Electrics (Pruge Controller)
- Fan Motor, Mill and Chemical Duty
- Special Paint:

Air Withdrawal Guide

REFER TO APPROPRIATE VACUPAC™ I FILTER MODULE DRAWING AND SPOUT DRAWINGS FOR AIR WITHDRAWAL RECOMMENDATIONS AND GUIDE. CONSULT FACTORY FOR VERIFICATION.

CAUTION: Many dry bulk products contain explosive dust. Midwest offers explosion proof (XP) electrics as an option for all electrical components and PLC controls. Intrinsically safe barriers are also available for hazardous areas. Consult factory for additional information and pricing.

*Based on 60 PCF fines. Add air gravity conveyor aeration and 50% of silo aeration air if applicable. 1400 STPH, 60 PCF materials equals 2720 CFM.