

TECHNICAL SPECIFICATIONS  
MIDWEST International  
VACUPAC™ I SERIES  
OPEN VEHICLE LOADING SPOUT

TO 1000TPH

MIA 30-0V

# 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 open vehicles or vessels 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 Current Technology (BACT) 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 limestone, resins and agricultural products, into open 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 Dust and displaced air is withdrawn through the annular area between the product column and the **Rhinoflex™** Flexible Outer Spout and into the **Vacupac™** I filter area where dust particles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 **MA30 - OV VACUPAC™** I OPEN VEHICLE LOADER

**MAIN PAN:** Standard construction ASTM A 36 carbon steel 7 GA(3/16) 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 15" diameter with (8) 3/8" diameter x 1" studs allows loader to be bolted to a **MIDWEST** sliding knife gate or withdrawal valve for silo withdrawal or **Multiflo™** Screw Conveyor, discharge.

**DRIVE:** Electric motor drive winch with totally enclosed motor and gear reducer mounted under the main pan for weather protection. 3/4 and 1 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 30'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 1000 STPH of 60 PCF product (free flowing fines). For throughput capacities other than 1000 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:** 4 feet to 20 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 with photohelic pressure differential backup is prewired and prepiped to a single point. 1" NPT pneumatic connection with 1" NPT maintenance valve is included. Pleated filter cartridges are standard in this series **Vacupac™** 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 **Spintrim™**I, **Spintrim™**II, **PAT™**, Paddle Wheel Trimmer or 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" 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 filter system and photohelic backup pressure differential system with digital readout is standard. Heavy duty 1" NPT 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 prepiped and prewired as standard. Purging air must be dry instrument air with no moisture. Contact factory for **explosion proof (XP) electrics**.

**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** 30-OV 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.

**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 and/or prepiping 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.

**ANTI DRIBBLE GATE:** Double opposed pneumatic sliding knife gate with stainless steel machined blades with "V" notch contact shuts off air gravity conveyor or silo withdrawal flow (dribble) in milliseconds.

### ACCESSORIES AVAILABLE

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 open vehicles when spout enclosed vehicle scavenger makes contact with the floor of an open vehicle, side of an open vehicle, or a partially developed pile. 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 RAISING KIT:** As product pile increases in height and pushes **MIDWEST** Flexible Skirt out, the tilt switch probe sends a signal to the Automatic Raising Kit NEMA 4X controller (shipped loose) which signals the spout to raise. Two timers are included to adjust probe sensitivity and duration of raising mode. Timer (#1) is used to delay signal to prevent accidental tilting and timer (#2) is used to signal motor how high to raise. One (1) probe standard, 2, 3 or 4 optional. stainless steel 6" diameter floatation ball included for light fluffy aerated products.

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

**FLEXIBLE SKIRT:** The Standard Flexible Skirt is constructed from neoprene or optional anti-static rubber. Skirt clamps to the lower rim of Outer Scavenger and conforms to product pile,

reducing dust emissions around spout discharge and increasing capture velocity. When using the skirt, the automatic raising probe is usually suspended on the outside of the skirt and is activated when the skirt pushes the probe out and at an angle above 10 degrees to engage the lifting motor.

**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.

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

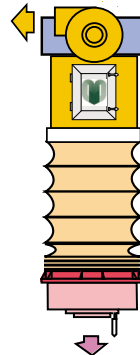
Technical specifications are subject to change without prior notification

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

EQUIPMENT OUTLINED IS AVAILABLE. CONSULT **MIDWEST** FOR DETAILS.

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# TECHNICAL DATA

## MA30-OV 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

#### MA30 OV Bulk Loading Spout

	VERTICAL TRAVEL	RETRACTED HEIGHT	WEIGHT CLASS I	WEIGHT IA,II,IV,V
<input type="checkbox"/>	04' (1.2)	28" (.71)	590 (268)	655 (290)
<input type="checkbox"/>	06' (1.8)	32" (.81)	637 (290)	740 (336)
<input type="checkbox"/>	08' (2.5)	36" (.91)	655 (298)	795 (361)
<input type="checkbox"/>	10' (3.0)	40" (1.02)	695 (316)	875 (398)
<input type="checkbox"/>	12' (3.5)	44" (1.12)	750 (341)	930 (423)
<input type="checkbox"/>	14' (4.2)	48" (1.22)	775 (352)	1020 (347)
<input type="checkbox"/>	16' (4.8)	52" (1.32)	865 (393)	1070 (486)
<input type="checkbox"/>	18' (5.5)	56" (1.42)	895 (407)	1155 (525)
<input type="checkbox"/>	20' (6.0)	60" (1.52)	925 (420)	1240 (564)

**Classes of Construction Available:** Refer to Technical Specification MA30 OV, Form No. 1356

#### Drive Winch Data

3/16" (4.7) diameter lift cables, as applicable (3) point pickup  
14 FPM lifting velocity (Average)

- .5 (1/2) HP Motor, TEFC Enclosure, 1140 (925) RPM. Reducer 60:1 ratio 935 IN/LBS Torque,  Safety Factor
- .75 (3/4) HP Motor, TEFC Enclosure, 1140 (925) RPM. Reducer 162:1 ratio 1460 IN/LBS Torque,   Safety Factor
- .75 (3/4) HP Brake Motor, TEFC Enclosure, 1750 (1425) RPM. Reducer 162:1 ratio 2782 IN/LBS Torque,  Safety Factor
- 1.0 (1) HP Brake Motor, TEFC Enclosure, 1750 (1425) RPM. Reducer 162:1 ratio 3709 IN/LBS Torque,  Safety Factor
- Special or (NSP)

#### Accessories

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

#### Options

- 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"/>	MA30 - 18	108	162	216	<input type="text"/>	203 LBS. (92) KG.
<input type="checkbox"/>	MA30 - 24	144	216	288	<input type="text"/>	229 LBS. (104) KG.
<input type="checkbox"/>	MA30 - 30	180	270	360	<input type="text"/>	255 LBS. (116) KG.
<input type="checkbox"/>	MA30 - 36	216	324	432	<input type="text"/>	281 LBS. (127) KG.
<input type="checkbox"/>	MA30 - 42	252	378	504	<input type="text"/>	308 LBS. (140) KG.
<input type="checkbox"/>	MA30 - 48	288	432	576	<input type="text"/>	334 LBS. (152) 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 (Purge 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. 500 STPH, 60 PCF product equals 902 CFM

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