VORTEX LOCAL REPRESENTATIVE

New Representative
Eastern Canada
Rate Technology Systems

Rate Technology Systems
Ontario: 905-607-3240
Quebec: 514-320-6380
Email: sales@ratetechnology.com
Mail: 1 Yonge St., Suite 1801
Toronto, Ontario, M5E 1W7

Titan SERIES

VALVES FOR DRY BULK PROCESSING & CONVEYING

Staying true to the Vortex design philosophy, we identified a need in the heavy-duty and abrasive material handling industries. When handling such materials, the most common causes of equipment maintenance or replacement are erosive wear and impact wear, which cause damage to a valve's internal parts. The Vortex Titan Series is specifically designed to protect against these forms of wear and abrasion. Characterized by unique design and robust metal materials of construction, the Vortex Titan Series features slide gates and diverters built for durability, reliability, ease of maintenance and prolonged service life.

Model No. TSXX

TITAN SLIDE GATE

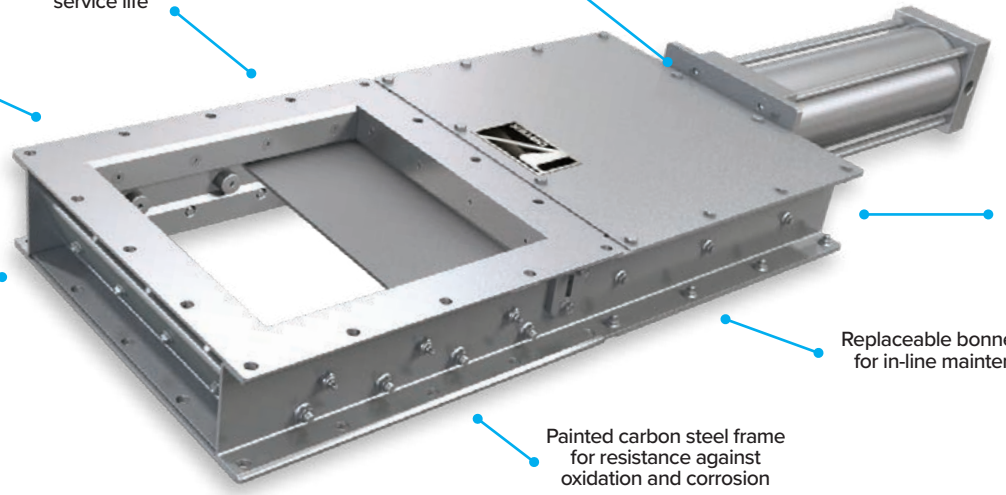
Ideal application: Installations above or below gravity-fed hoppers/silos, mixers, and augers/screw conveyors. Custom sizes are available to accommodate any combination of gate stroke or width.

Purpose: A robust roller-supported slide gate featuring bonnet seals and side seals to provide a better seal of fine materials and dusts across the blade and to atmosphere.


Square


Rectangle

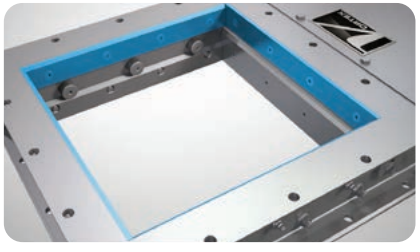

Dual Cylinder



KEY FEATURES


Live loaded, wear compensating hard polymer bonnet and side seals


Displacement pocket prevents wedging and packing into an end seal. For fine materials, standard end seal is available.


Seals are protected by a series of deflectors and retainers to reduce wear and extend service life


Cam-adjustable rollers for in-line maintenance

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive powders, pellets and granules. Modifications available for handling abrasive, fine materials.
Standard Sizes	6 – 36 in | 150 – 915 mm Contact us for custom sizes
Opening	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	4 – 6 in | 100 – 150 mm
Weight	50 – 560 lb | 25 – 255 kg
Flange Options	Standard flange Custom flanges are available
Material Temperatures	250°F | 120°C for standard gate, with modifications that allow up to 400°F | 205°C
Body/Frame Construction	Carbon steel
Material Contact Options	400 BHN abrasion-resistant steel, carbon steel, 304 stainless steel
Bonnet & Side Seal Options	PET, 25% glass-filled PTFE
Load Seal Construction	Silicone rubber
Roller Options	Hardened steel, 304 stainless steel, bronze bushings
End Seal Construction	25% glass-filled PTFE
Drive/Actuation	Double-acting air cylinder (see pages 61 & 62)
Position Confirmation	Proximity switches, magnetic reed switches and/or clear bonnet cover for visual indication (see page 63)
Material Flow Controls	AVP, IVP, VPO, VPC (see pages 65 & 66)
Other Options	Dual cylinder actuators (see page 61) Return pan & Special Service Inlet (see page 67)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

THE POWER OF COMPARISON

Vortex Titan Slide Gate vs. Alternatives

The Vortex® Titan Slide Gate™ provides significant advantages over alternative roller-supported slide gates:

- Many alternative roller-supported slide gates rely on soft rubber seals which are directly exposed to the material flow stream. These seals rapidly erode or tear away in service. Others rely on bonnet packing, which can relax and allow material packing in the bonnet area. These deficiencies promote leakage of materials and dusts past the gate and to atmosphere, in addition to actuation issues and several other maintenance concerns. The Titan Slide Gate addresses these issues by incorporating "live loaded" hard polymer bonnet seals and side seals. Hard polymer provides greater wear resistance and longer service life than alternative sealing materials. The hard polymer seals are "live loaded" with compressed rubber backing to ensure even as the polymer experiences frictional wear from many actuations over time, the rubber load seals continuously force the polymer seals against the sliding blade. When equipped with a Special Service Inlet, the seals and rollers are also shielded from the material flow stream, to protect them from abrasion. This design maintains the gate's positive seal of materials/dust-tight seal with infrequent maintenance intervention.

- If materials and dusts begin to migrate and collect in the gate's bonnet area, it indicates that the gate's bonnet seals have partially worn and the compression load is lessened, causing the seals to no longer be forced against the sliding blade as they should be. With this maintenance indication, the Titan Slide Gate features access slots on each side of the gate that allow bonnet seal replacement while the gate remains in-line. Using simple tools, new bonnet seals are driven into one access port as the worn bonnet seals are simultaneously ejected on the other side of the gate, through the opposite access port.

- Many alternative slide gates allow metal-on-metal sliding, which creates galling. This causes a gate to seize and bind, and can create foreign metal fragment contamination. The Titan Slide Gate's hard polymer seals eliminate metal-on-metal contact to resolve each of these concerns.

- Many alternative roller-supported slide gates have open cavities where materials can wedge and prevent positive material shut-off. Wedging can also create seal wear and material degradation, and cause a gate to seize and bind. Wedged materials also create risk for cross-contamination and spoilage. To prevent wedging and ensure positive gate closure, the Titan Slide Gate's sliding blade is designed to mechanically clear materials away from the sealing surfaces with each actuation. With each closing stroke, the Titan Slide Gate mechanically self-cleans its side seals. With each opening stroke, the gate's bonnet seals prevent the blade from carrying materials back into the bonnet area. Both of these considerations ensure migrant materials are forced back out of the seals and are discharged into the process line, rather than packing in the seals and causing actuation issues.

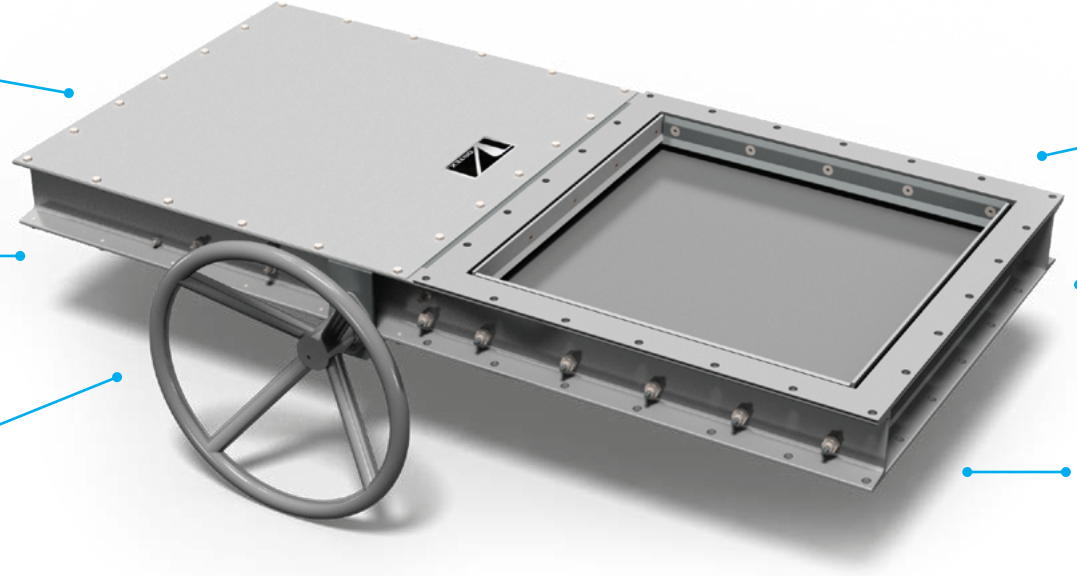
- Many alternative slide gates pack materials into an end seal, preventing positive closure. This promotes material leakage through the valve, can cause blade damage, and can cause other actuation issues. In the Titan Slide Gate, the leading edge of the sliding blade is beveled. The gate is also designed with a displacement pocket, rather than a true end seal. Both of these features ensure that materials remaining at the leading edge of the blade can fall away into the process line below, rather than packing into an end seal.

For more information & technical resources, please visit: **www.vortexglobal.com**

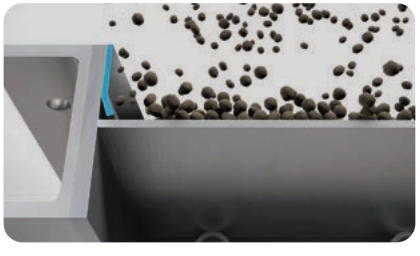
Model No. AXX

AGGREGATE GATE

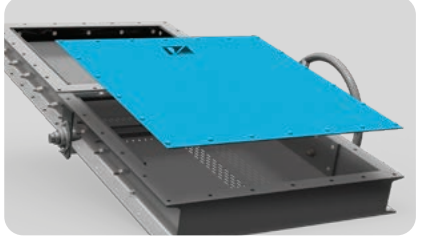
Ideal application: Similar in design to the Vortex® Titan Slide Gate™ but vastly different in scope, the Vortex® Aggregate Gate™ is ideal for handling larger-size, abrasive dry bulk solid materials in applications where fine materials and dusts are of less concern.



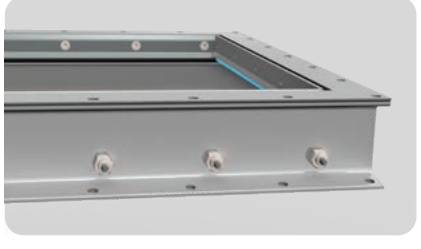
KEY FEATURES



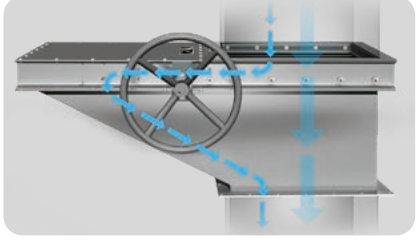
Seals are protected by a series of deflectors and retainers to reduce wear and extend service life



Removable bonnet cover for in-line maintenance



Displacement pocket prevents wedging and packing into an end seal



Optional return pan redirects migrant materials in the bonnet area back into the material flow (see *Accessories* page 67)

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials with large particle sizes, such as minerals, coal and aggregates
Standard Sizes	6 – 24 in | 150 – 610 mm Contact us for custom sizes
Opening	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	4 in | 110 mm
Weight	85 – 395 lb | 40 – 180 kg
Flange Options	Standard flange Custom flanges are available
Material Temperatures	180°F | 80°C for standard gate, with modifications that allow up to 550°F | 290°C
Body/Frame Options	Carbon steel, stainless steel
Material Contact Options	Carbon steel, 304 stainless steel, 235 BHN abrasion-resistant steel, SAE 660 bronze
End, Bonnet & Side Seal Options	Belted rubber, chute rubber, bronze
Roller Options	Hardened steel, 304 stainless steel & bronze, 25% glass-filled PTFE, nylon, bronze
Drive/Actuation	Double-acting air cylinder, hand wheel, chain wheel, electric actuator, hydraulic actuator (see pages 61 & 62)
Position Confirmation	Magnetic reed, proximity or mechanical limit switches (see page 63)
Other Options	Return pan & Special Service Inlet (see page 67)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

THE POWER OF COMPARISON

Vortex Aggregate Gate vs. Alternatives

The Vortex® Aggregate Gate™ offers many distinct advantages over alternative slide gates used in abrasive material handling applications:

- Many alternative slide gates allow metal-on-metal sliding, which creates galling. This causes a gate to seize and bind, and can create foreign metal fragment contamination. The Aggregate Gate's internal nylon gate liners and blade guides eliminate metal-on-metal contact to resolve each of these concerns.
- Unlike other roller-supported slide gates used in abrasive material handling applications, the Aggregate Gate's resilient rubber seals provide a positive material shut-off.
- Many alternative slide gates cannot be maintained while in-line. This can lead to expensive and extensive production downtime. The Aggregate Gate features blade rollers that can be externally greased while the gate remains in-line.
- Many alternative slide gates pack materials into an end seal, preventing positive closure. This promotes material leakage through the valve, can cause blade damage, and can cause other actuation issues. The Aggregate Gate is designed to trap larger material against a rubber seal until the gate is reopened.
- Many alternative roller-supported slide gates have open cavities where materials can wedge and prevent positive material shut-off. Wedging can also create seal wear and material degradation, and cause a gate to seize and bind. Wedged materials also create risk for cross-contamination and spoilage. To prevent wedging and ensure positive gate closure, the Aggregate Gate's sliding blade is designed to mechanically clear materials away from the sealing surfaces with each actuation. With each closing stroke, the Aggregate Gate mechanically self-cleans its side seals. With each opening stroke, a rubber scraper seal hinders the blade from carrying materials back into the bonnet area. Both of these considerations ensure migrant materials are forced back out of the seals and are discharged into the process line, rather than packing in the seals and causing actuation issues.

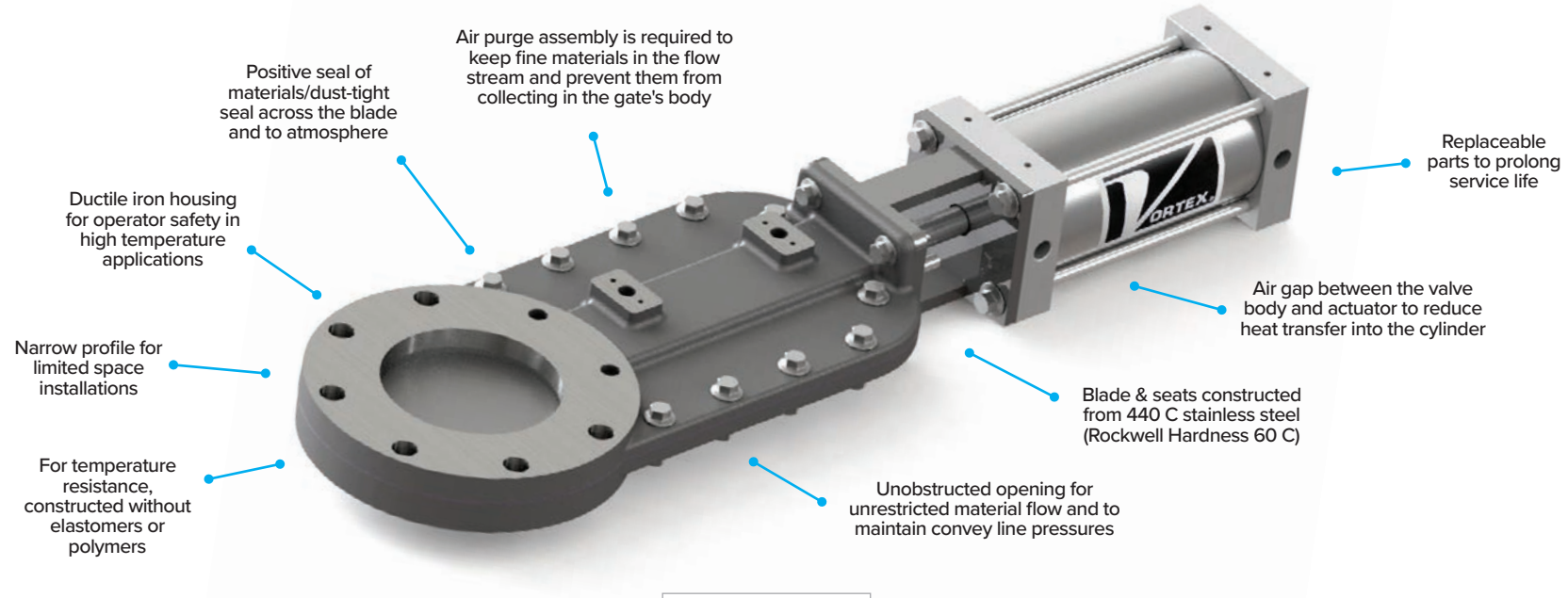
For more information & technical resources, please visit: **www.vortexglobal.com**

Model No. TPVXX

TITAN PRESSURE VALVE

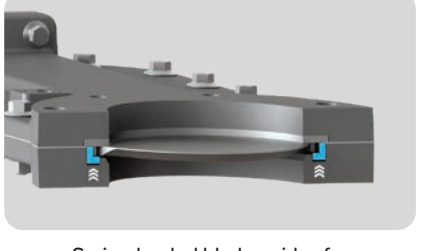
Ideal application: Higher-temperature and/or higher-pressure applications handling highly abrasive dry bulk solid materials. The Vortex® Titan Pressure Valve™ often replaces deficient slide gates and butterfly valves used in such environments.

Purpose: The Titan Pressure Valve's unique "rising blade" is designed to close into an end seat. This provides an optimal seal of high pressures and a positive material shut-off.

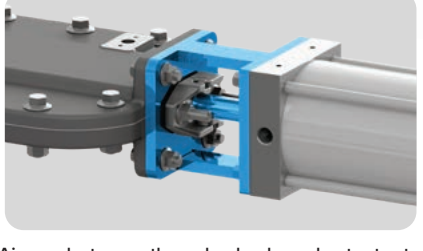


KEY FEATURES

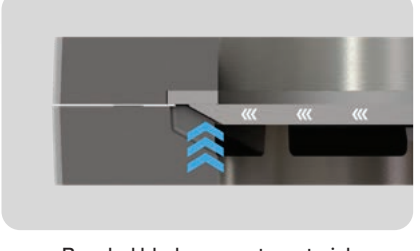
Replaceable packing gland for in-line maintenance



Spring-loaded blade guides for positive gate closure



Air gap between the valve body and actuator to reduce heat transfer into the cylinder



Beveled blade prevents material packing into the end seat

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow, dilute phase and dense phase pneumatic conveying applications. Can handle differential pressures up to 100 psig | 6.8 barg | 0.69 MPa, depending on gate size. Can be used in pressure or vacuum systems.
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	2 – 12 in | 50 – 305 mm Contact us for custom sizes
Opening	Available in round sizes
Overall Height	2 – 3 in | 50 – 75 mm
Weight	45 – 250 lb | 20 – 115 kg
Flange Options	ANSI #125/150, DIN PN10
Material Temperatures	Up to 660° F | 350° C
Body/Frame Construction	Cast ductile iron
Material Contact Construction	440C stainless steel (Rockwell Hardness 60 C) & ductile iron
Seat Construction	440C stainless steel (Rockwell Hardness 60 C)
Drive/Actuation	Double-acting air cylinder (see pages 61 & 62)
Position Confirmation	Magnetic reed, proximity or mechanical limit switches (see page 63)
Material Flow Controls	AVP (see pages 65 & 66)
Required Accessories	Sealed body air purge (see page 64)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external)

THE POWER OF COMPARISON

Vortex Titan Pressure Valve vs. Alternatives

- Many alternative slide gates and butterfly valves rely on seals which are directly exposed to the material flow stream. These seals rapidly erode or tear away in service. This deficiency promotes leakage of materials and dusts past the gate and to atmosphere, in addition to actuation issues and several other maintenance concerns. To address these issues, the Vortex® Titan Pressure Valve™ is designed without polymer or elastomer seals. This ensures the gate's seal is not compromised by extreme pressure, temperature or abrasion. This design maintains the gate's positive seal with infrequent maintenance intervention.

- Many alternative slide gates pack materials into an end seal, preventing positive closure. This promotes material leakage through the valve, can cause blade damage, and can cause other actuation issues. Upon gate closure, the Titan Pressure Valve's sliding blade "rises" upward into a seat, rather than a true end seal, so that materials remaining at the leading edge of the blade can fall away into the process line below, rather than packing into an end seal. This design provides a better seal of materials and dusts in high pressure applications.

- A butterfly valve's rotating disc is directly exposed to the material flow steam, which creates wear to the disc itself. The exposed disc also disrupts convey line pressures and obstructs material flow as they pass through the valve, which can cause line plugs and other maintenance concerns. To resolve these issues, when the Titan Pressure Valve is open, its sliding blade is recessed to create an unobstructed opening that maintains convey line pressure and allows unrestricted material movement.

- The Titan Pressure Valve features spring-loaded blade guides along the full stroke of the gate to ensure the blade is kept in constant contact with the seals throughout each actuation. The blade guides also assist in “lifting” the blade into its end seat. This design ensures the gate’s positive seal of materials and dusts over time. The Titan Pressure Valve also features an additional spring-loaded blade guide that runs perpendicular to the sliding blade. This strengthens the center of the blade to further ensure the gate’s positive seal.

- In high pressure applications, the Titan Pressure Valve’s required air purge assembly is essential to keeping fine materials in the flow stream and out of the body of the valve.

INSTALLATION REQUIREMENTS

The Vortex® Titan Pressure Valve™ must be installed so that the actuator is parallel to the horizontal plane.

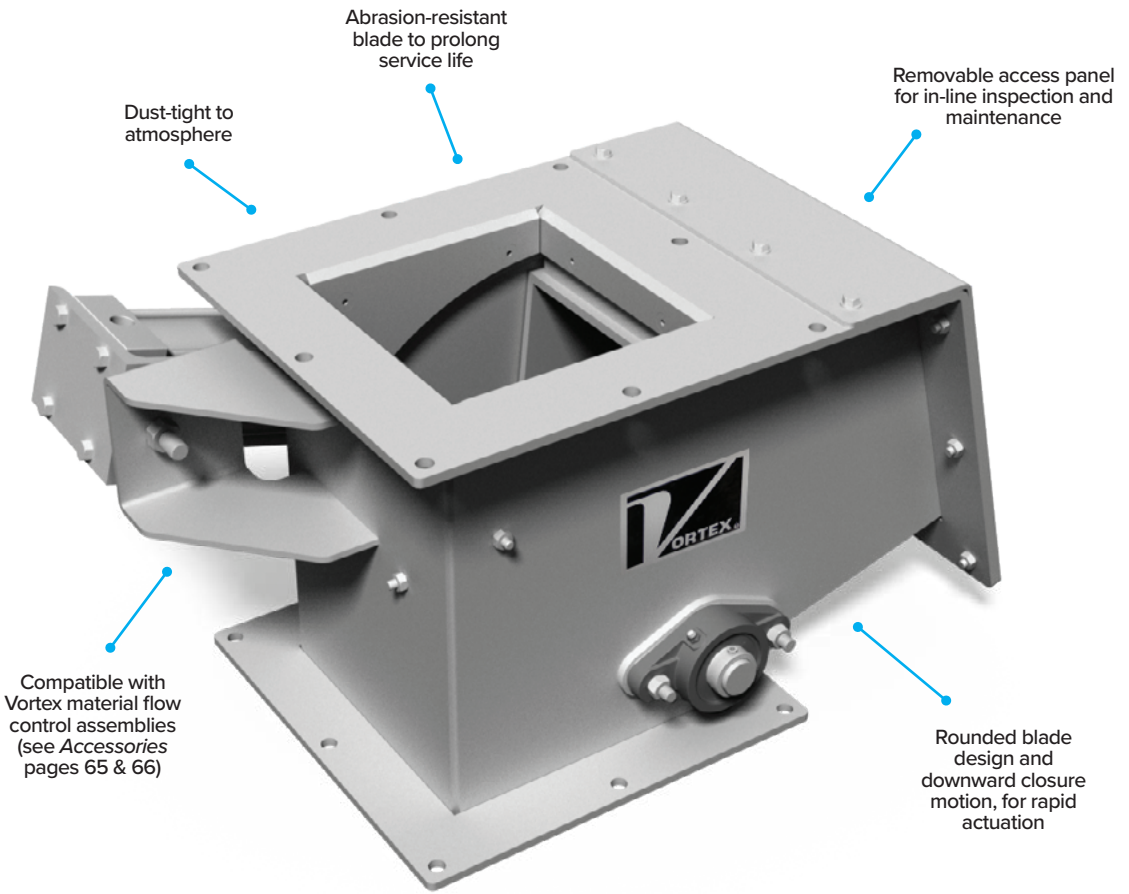
For more information & technical resources, please visit: **www.vortexglobal.com**

Model No. RBGXX

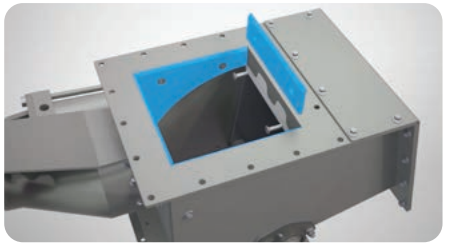
ROUNDED BLADE GATE

Ideal application: Above a storage bin or loadout station. Often used to meter flow and hold back large heads of material.

Purpose: Fast actuation for accurate metering control and quick material shut-off.



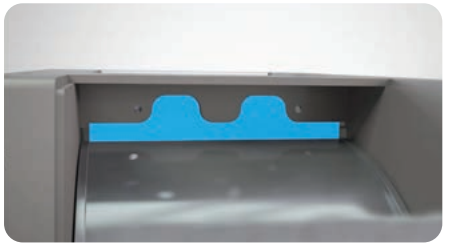
KEY FEATURES



Replaceable liners for added abrasion resistance

True arc design for a more precise sealing surface that prevents wedging, lodging and spoilage

Positive seal of materials/dust-tight seal across the gate and to atmosphere



Replaceable bonnet seal for in-line maintenance

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	6 – 24 in | 150 – 610 mm Custom sizes available
Opening	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	9 – 34 in | 230 – 865 mm
Weight	95 – 965 lb | 40 – 435 kg
Flange Options	Standard flange Custom flanges are available
Material Temperatures	250°F | 120°C for standard gate, with modifications that allow up to 400°F | 205°C
Body/Frame Construction	Carbon steel
Material Contact Options	400 BHN abrasion-resistant steel, carbon steel
Arc Seal Construction	Polymer & rubber
Drive/Actuation	Double-acting air cylinder, electric actuator, hydraulic actuator (see pages 61 & 62)
Position Confirmation	Proximity switches (see page 63)
Material Flow Controls	AVP, IVP (see pages 65 & 66)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

THE POWER OF COMPARISON

Vortex Rounded Blade Gate vs. Alternatives

- Compared to conventional slide gates, the Vortex® Rounded Blade Gate™ actuates with much quicker speed and greater closing force. Generally speaking, the Rounded Blade Gate can actuate 2x faster than a conventional, pneumatically actuated slide gate. The purpose is to provide a quicker material shut-off.
- When filling to specific batchweights, actuation limitations can impose on accuracy. The Rounded Blade Gate is compatible with Vortex's many material flow control assemblies, to accommodate blade actuation into several intermediate positions. This allows total flow control for proper metering, which lends accuracy and repeatability to a manufacturing process.
- Other curved blade gates have sealed bodies, which limits interior access. In order to perform inspection and/or maintenance, the gate must be removed from the process line so that its internal mechanisms can be accessed. This can lead to expensive and extensive production downtime. To allow in-line inspection and/or maintenance, the Rounded Blade Gate is designed with a removable access panel that can be removed using simple tools. This feature is especially beneficial in abrasive applications where frequent interior access is required for wear part maintenance. The removable access panel feature significantly reduces downtime by accelerating the maintenance process.
- Many conventional slide gates allow leakage of materials and dusts to atmosphere. The Rounded Blade Gate is dust-tight to atmosphere, meaning it is a self-contained unit specifically designed to contain materials and dusts within the system. Therefore, the Rounded Blade Gate supports workplace safety initiatives, reduces product loss, and addresses atmospheric dust emissions and other potential environmental hazards.

For more information & technical resources, please visit: **www.vortexglobal.com**

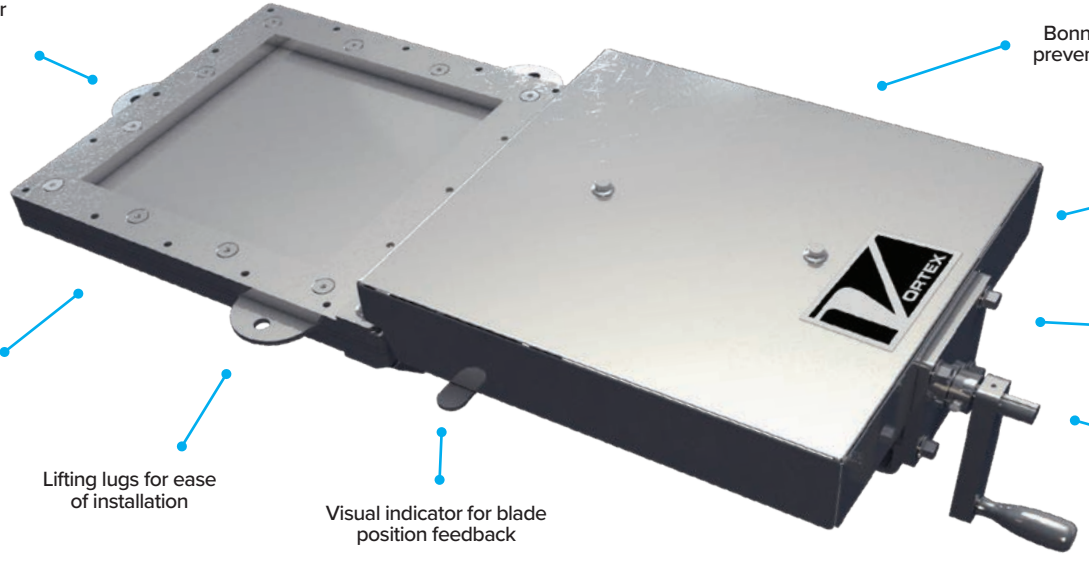
Model No. GRXX

TITAN MAINTENANCE GATE

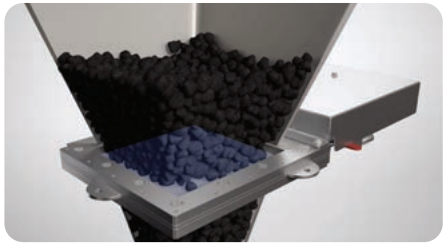
Ideal application: Shut off material flow when maintenance of downstream equipment is required or if an upset condition occurs.

Square

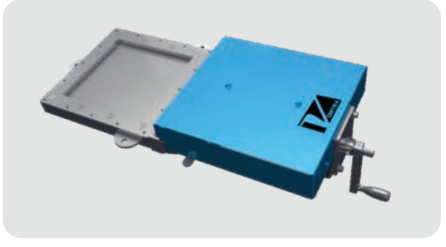
Round



KEY FEATURES



Designed to close through a standing column of material in the case of an upset condition



Bonnet cover for operator safety and to protect the gate from its environment

Narrow profile for limited space installations

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only. In the open position, will seal to atmosphere against slight differential pressure.
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	6 – 20 in | 150 – 510mm Contact us for custom sizes
Opening	Available in square, round or rectangular sizes. Transition options are available (see page 67)
Overall Height	less than 2 in | 50 mm
Weight	95 – 440 lb | 45 – 200 kg
Flange Options	Standard flange, ANSI #125/150, DIN PN10 Custom flanges are available
Material Temperatures	250° F | 120° C for standard gate, with modifications that allow up to 400° F | 205° C
Body/Frame Construction	Carbon steel
Material Contact Construction	304 stainless steel, carbon steel
Bonnet Seal Construction	PTFE-treated packing
Clevis Construction	ACME threaded rod, 5:1 or 11.5:1 ratio, depending on gate size
Drive/Actuation	Double-acting air cylinder, hand wheel/crank, chain wheel (see pages 61 & 62)
Position Confirmation	Proximity switches (see page 63)
Compliance	Machinery Directive 2006/42/EC

THE POWER OF COMPARISON

Vortex Titan Maintenance Gate vs. Alternatives

The design and construction of the Vortex® Titan Maintenance Gate™ offers significant advantages over traditional maintenance gates.

- The Titan Maintenance Gate can be built with either a square or round opening. This allows the Titan Maintenance Gate to be adapted to almost any convey line shape or size.
- With less than 2 inches | 50 millimeters of overall flange-to-flange height, the Titan Maintenance Gate is narrow profile for easier installation when available space is limited.
- The Titan Maintenance Gate's carbon steel body and frame make it durable and resistant to abrasion, wear and corrosion – both from the material(s) handled and from the environment.
- Many alternative maintenance gates rely on soft rubber seals which are directly exposed to the material flow stream. These seals rapidly erode or tear away in service. This deficiency promotes leakage of materials and dusts past the gate and to atmosphere, in addition to actuation issues and several other maintenance concerns. The Titan Maintenance Gate addresses these issues by incorporating a bonnet seal cartridge, which houses a PTFE-treated packing gland. PTFE-treated packing gland provides greater wear resistance and longer service life than alternative sealing materials. Within the bonnet seal cartridge, the packing gland expands to create a dust-tight seal around the vertical perimeter of the blade. The bonnet seal cartridge shields the packing gland from the material flow stream, to protect it from abrasion. This design maintains the gate's positive seal with infrequent maintenance intervention. Once the packing gland has experienced significant frictional wear, it can be removed and replaced to restore the gate's dust-tight seal. This maintenance process can be performed while the gate remains in-line.
- Many alternative maintenance gates use less durable sealing materials which are ill-equipped for handling abrasive and/or higher-temperature materials. For greater temperature- and abrasion-resistance, the Titan Maintenance Gate is designed without polymer seals.

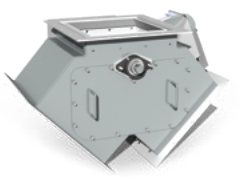
For more information & technical resources, please visit: **www.vortexglobal.com**

Model No. BDXX

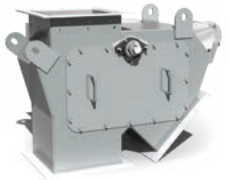
AGGREGATE DIVERTER

Ideal application: Used to divert heavy-duty and/or abrasive dry bulk solid materials from one source toward two destinations in gravity-fed applications. The Vortex® Aggregate Diverter™ often replaces conventional "bucket" diverters used in such environments.

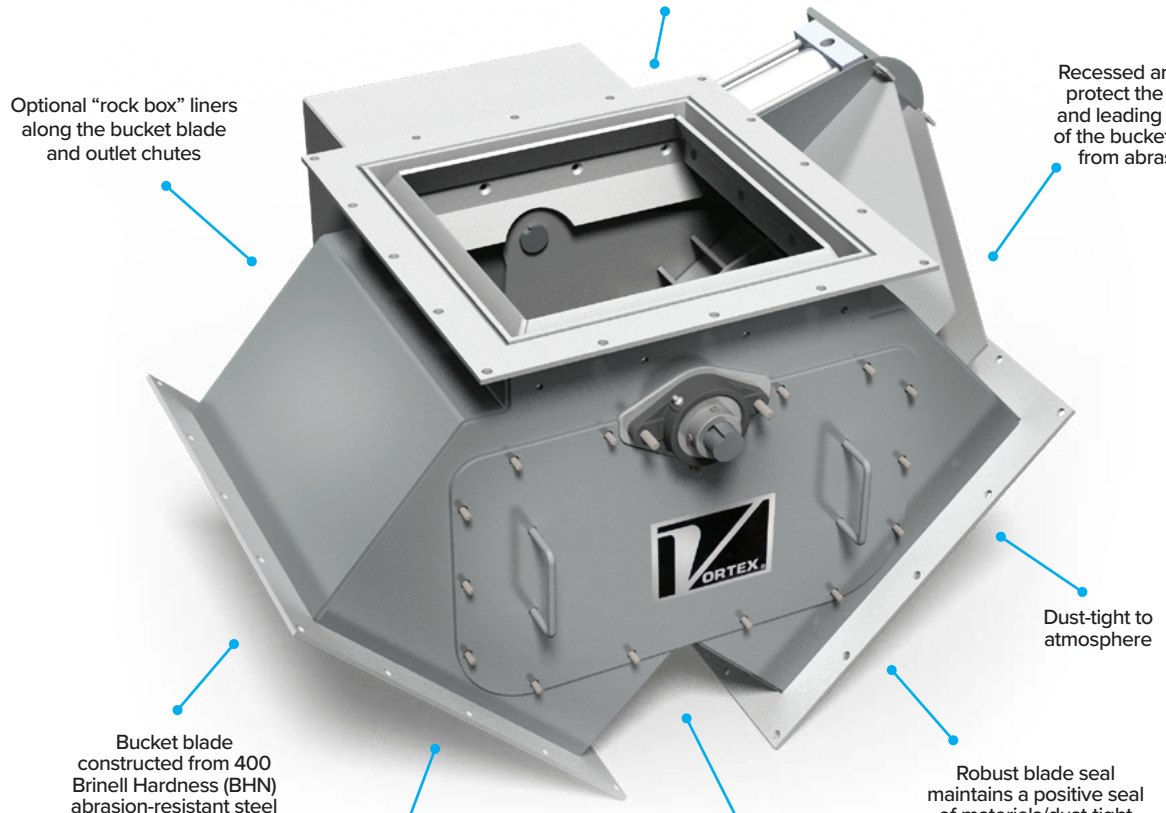
Purpose: In-line maintenance features and durable materials of construction to reduce downtime and prolong service life.



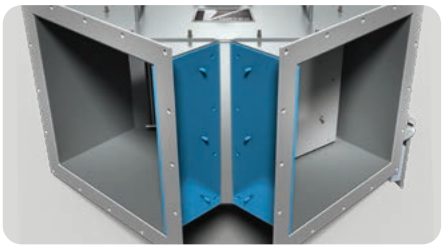
A- Style



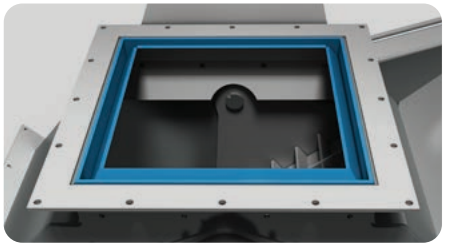
Straight Leg



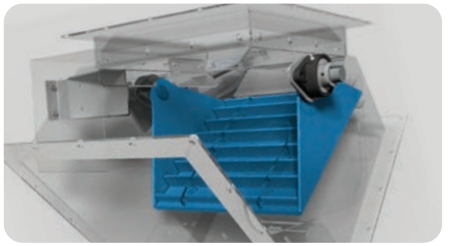
KEY FEATURES



Optional chute liners to protect against wear and abrasion



Optional dead pocket inlet allows materials to abrade upon themselves as they pass through the inlet



Optional "rock box" liners allow materials to collect and abrade upon themselves, rather than continuously abrading upon the diverter's material contact areas

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	6 – 24 in | 152 – 610 mm Contact us for custom sizes
Inlet & Outlets	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	15x24 in — 50x73 in | 380x610 mm — 1,270x1,855 mm
Weight	70 – 1,275 lb | 30 –580 kg
Outlet Angle Options	30° or 45° from center Contact us for custom angles
Flange Options	Standard flange, ANSI #125/150, DIN PN10 Custom flanges are available
Material Temperatures	250°F | 120°C for standard gate, with modifications that allow up to 400°F | 205°C
Body/Frame Construction	Painted carbon steel
Material Contact Options	400 BHN abrasion-resistant steel, carbon steel
Liner Options	400 BHN abrasion-resistant steel, UHMW, rubber, “rock box”
Bucket Seal Options	Chute rubber, silicone rubber, Kryptane® abrasion-resistant polyurethane
Drive/Actuation	Double-acting air cylinder, hand lever, electric actuator (see pages 61 & 62)
Position Confirmation	Magnetic reed, proximity or mechanical limit switches (see page 63)
Other Options	Spin knobs (see page 68)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

THE POWER OF COMPARISON

Vortex Aggregate Diverter vs. Alternatives

- Many alternative bucket diverters are constructed from less durable metal materials of construction. When handling heavy-duty and/or abrasive dry bulk solid materials, rapid wear and abrasion will result in frequent maintenance and diverter replacement. To address this concern, the body of the Vortex® Aggregate Diverter™ is constructed from carbon steel. Its bucket blade is constructed from 400 Brinell Hardness Number (BHN) abrasion-resistant steel.

- Many alternative bucket diverters have thin elastomer seals adhered to the perimeter of the blade. Over time, the thin seals erode or tear away from the blade and allow material leakage into the opposite chute. The Aggregate Diverter addresses this concern by incorporating a bucket seal constructed from a full sheet of durable rubber. Rather than adhering thin seal strips around the perimeter of the bucket, the robust seal sheet is bolted beneath the bucket and secured by a bolt-in metal plate. This design ensures the bucket seal will not tear away in service, and will provide a positive seal of materials/dust-tight seal over time.

- Many alternative bucket diverters are designed so that the leading edges of the bucket are constantly exposed to the material flow stream, creating wear and abrasion to the blade and bucket seal. If wear is significant, it can allow material leakage into the opposite chute, in addition to frequent wear part maintenance. To address these concerns, the Aggregate Diverter is designed with recessed areas so that the leading edges of the bucket are shielded from the material flow stream.

- Many alternative bucket diverters are designed with irreplaceable wetted parts. Once a primary wetted part is worn significantly, the entire diverter must be replaced. To resolve this cost-effectiveness issue, the Aggregate Diverter is designed with replaceable wetted parts that can be accessed in-line. This includes actuator, bucket, and bucket seal, among others. If maintained and operated as recommended, these should be the diverter's only wear parts. In several cases, this has allowed an Aggregate Diverter to remain in service for many years – and sometimes, even decades.

- Many alternative bucket diverters have sealed bodies, which limits interior access. In order to perform inspection and/or maintenance, the diverter must be removed from the process line so that its internal mechanisms can be accessed. This can lead to expensive and extensive production downtime. To allow in-line inspection and/or maintenance, the Aggregate Diverter is designed with a removable access panel that can be removed using simple tools. This feature is especially beneficial in abrasive applications where frequent interior access is required for wear part maintenance. The removable access panel feature significantly reduces downtime by accelerating the maintenance process.

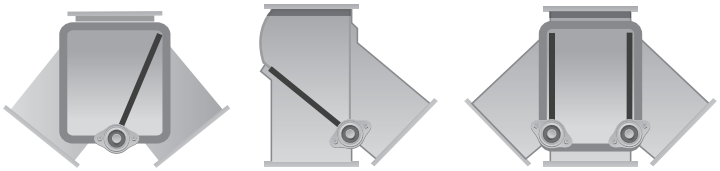
For more information & technical resources, please visit: **www.vortexglobal.com**

Model No. ZXX

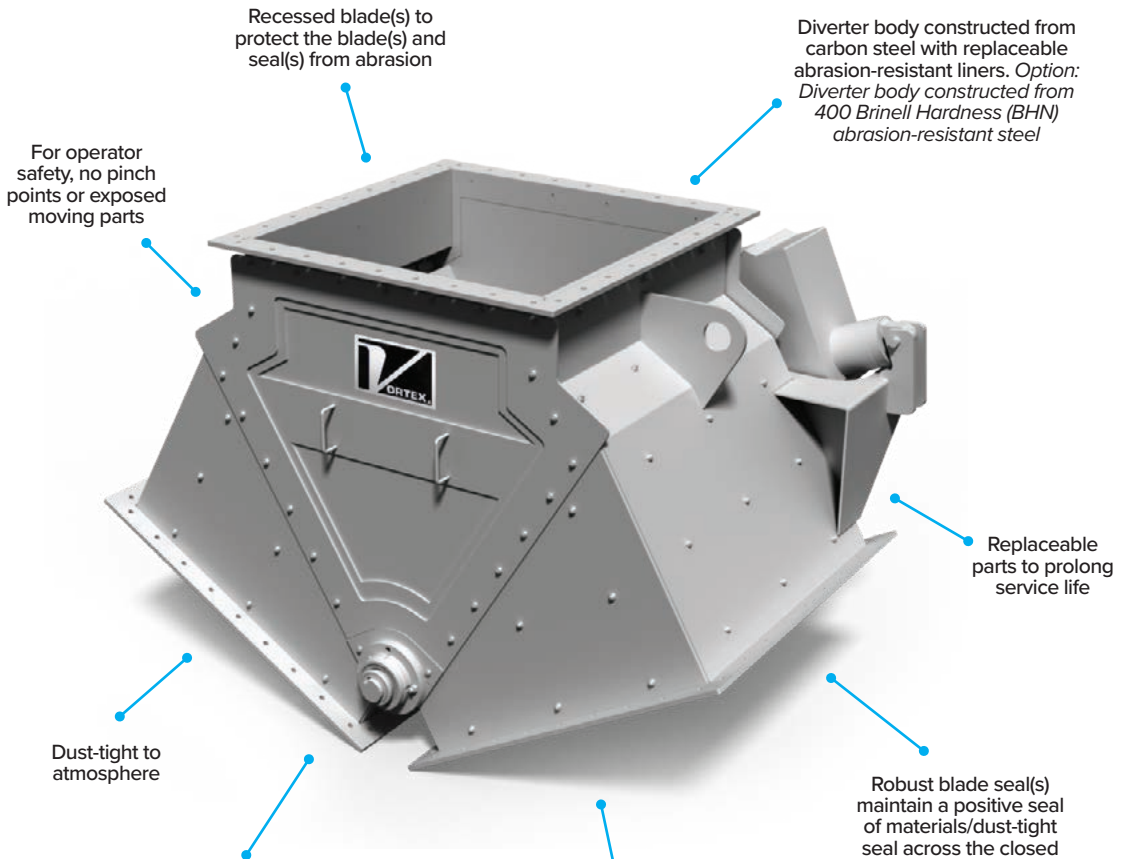
TITAN LINED DIVERTER

Ideal application: Used to divert heavy-duty and/or abrasive dry bulk solid materials from one source toward two or three destinations in gravity-fed applications.

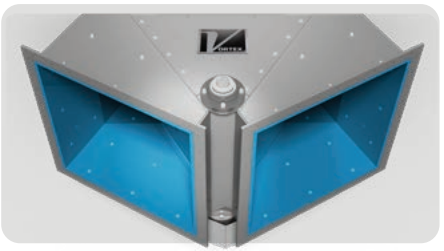
Purpose: The Vortex® Titan Lined Diverter™ offers in-line maintenance features, durable materials of construction, reduced downtime, prolonged service life and many other significant advantages over alternative flap diverters.



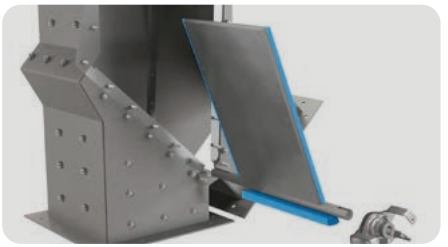
Two-Way | Straight Leg | Three-Way



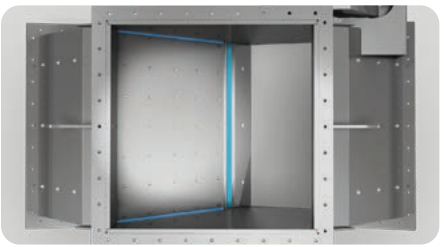
KEY FEATURES



Replaceable abrasion-resistant liners protect against wear and abrasion to prolong service life



Removable access panel for in-line inspection and maintenance



Robust blade seal(s) maintain a positive seal of materials/dust-tight seal across the closed chute(s), to prevent material leakage into the opposite chute(s)

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	16 – 36 in | 400 – 900mm Contact us for custom sizes
Inlet & Outlets	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	25 – 75 in | 650 – 1,905 mm
Weight	140 – 1,265 lb | 65 – 575 kg
Outlet Angle Options	30° or 45° from center Contact us for custom angles
Flange Options	Standard flange, ANSI #125/150, DIN PN10 Custom flanges are available
Material Temperatures	250°F | 120°C for standard gate, with modifications that allow up to 400°F | 205°C
Body/Frame Construction	400 BHN abrasion-resistant steel
Material Contact Options	400 BHN abrasion-resistant steel, carbon steel
Liner Options	400 BHN abrasion-resistant steel, UHMW, rubber
Blade Seal Options	Buna-N nitrile rubber, silicone rubber, polyurethane, EPDM rubber
Shaft Seal Options	PET, 25% glass-filled PTFE
Load Seal Construction	Silicone rubber
Drive/Actuation	Double-acting air cylinder, hand lever, chain wheel, electric actuator (see pages 61 & 62)
Position Confirmation	Magnetic reed, proximity or mechanical limit switches (see page 63)
Other Options	Spin knobs (see page 68)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

THE POWER OF COMPARISON

Vortex® Titan Lined Diverter vs. Alternatives

- Many alternative flap diverters have sealed bodies, which limits interior access. In order to perform inspection and/or maintenance, the diverter must be removed from the process line so that its internal mechanisms can be accessed. This can lead to expensive and extensive production downtime. To allow in-line inspection and/or maintenance, the Vortex® Titan Lined Diverter™ is designed with a removable access panel that can be removed using simple tools. This feature is especially beneficial in abrasive applications where frequent interior access is required for wear part maintenance. The removable access panel feature significantly reduces downtime by accelerating the maintenance process.

- Many alternative flap diverters are constructed from less durable metal materials of construction. When handling heavy-duty and/or abrasive dry bulk solid materials, rapid wear and abrasion will result in frequent maintenance and diverter replacement. To address this concern, the body of the Titan Lined Diverter is constructed from carbon steel with replaceable abrasion-resistant liners, or (optional) body constructed from 400 Brinell Hardness Number (BHN) abrasion-resistant steel. For added protection, the Titan Lined Diverter can feature (optional) replaceable abrasion-resistant liners. By incorporating abrasion-resistant liners, it ensures materials are abrading upon replaceable parts, rather than wearing the underlying material contact areas. The addition of abrasion-resistant liners significantly prolongs a diverter's service life.

- Many alternative flap diverters are designed so that the leading edge of the blade(s) is constantly exposed to the material flow stream, creating wear and abrasion to the blade(s) and seal(s). If wear is significant, it can allow material leakage into the opposite chute(s), in addition to frequent wear part maintenance. To address these concerns, the Titan Lined Diverter is designed with recessed areas so that the leading edge of the blade(s) is shielded from the material flow stream.

- Many alternative flap diverters are designed with irreplaceable wetted parts. Once a primary wetted part is worn significantly, the entire diverter must be replaced. To resolve this cost-effectiveness issue, the Titan Lined Diverter is designed with replaceable wetted parts that can be accessed in-line. This includes actuator(s), flapper blade(s) and blade seal(s), the blade shaft seal(s), and the (optional) abrasion-resistant liners, among others. If maintained and operated as recommended, these should be the diverter's only wear parts. In several cases, this has allowed a Titan Lined Diverter to remain in service for many years – and sometimes, even decades.

- Many alternative flap diverters do not have seals beneath the blade shaft(s). This creates a significant opening for material migration into the opposite chute(s). Especially in perishable applications, this can foster cross-contamination and spoilage beneath the blade shaft(s). Also, without blade shaft seals, the blade shaft(s) is subjected to material-assisted abrasion, resulting in frequent wear part maintenance. The Titan Lined Diverter addresses these issues by incorporating "live loaded" hard polymer blade shaft seal(s). Hard polymer provides greater wear resistance and longer service life than alternative sealing materials. The hard polymer seal(s) is "live loaded" with compressed rubber backing to ensure even as the polymer experiences frictional wear from many actuations over time, the rubber load seals continuously force the polymer seal(s) upward against the blade shaft(s). The seal(s) is also shielded from the material flow stream, to protect it from abrasion. This design maintains the diverter's positive seal of materials/dust-tight seal with infrequent maintenance intervention.

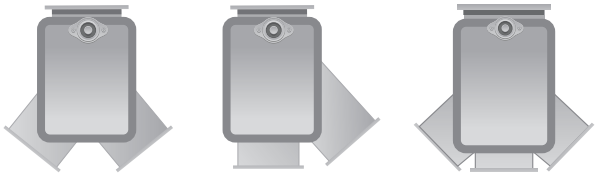
For more information & technical resources, please visit: **www.vortexglobal.com**

Model No. PCXX

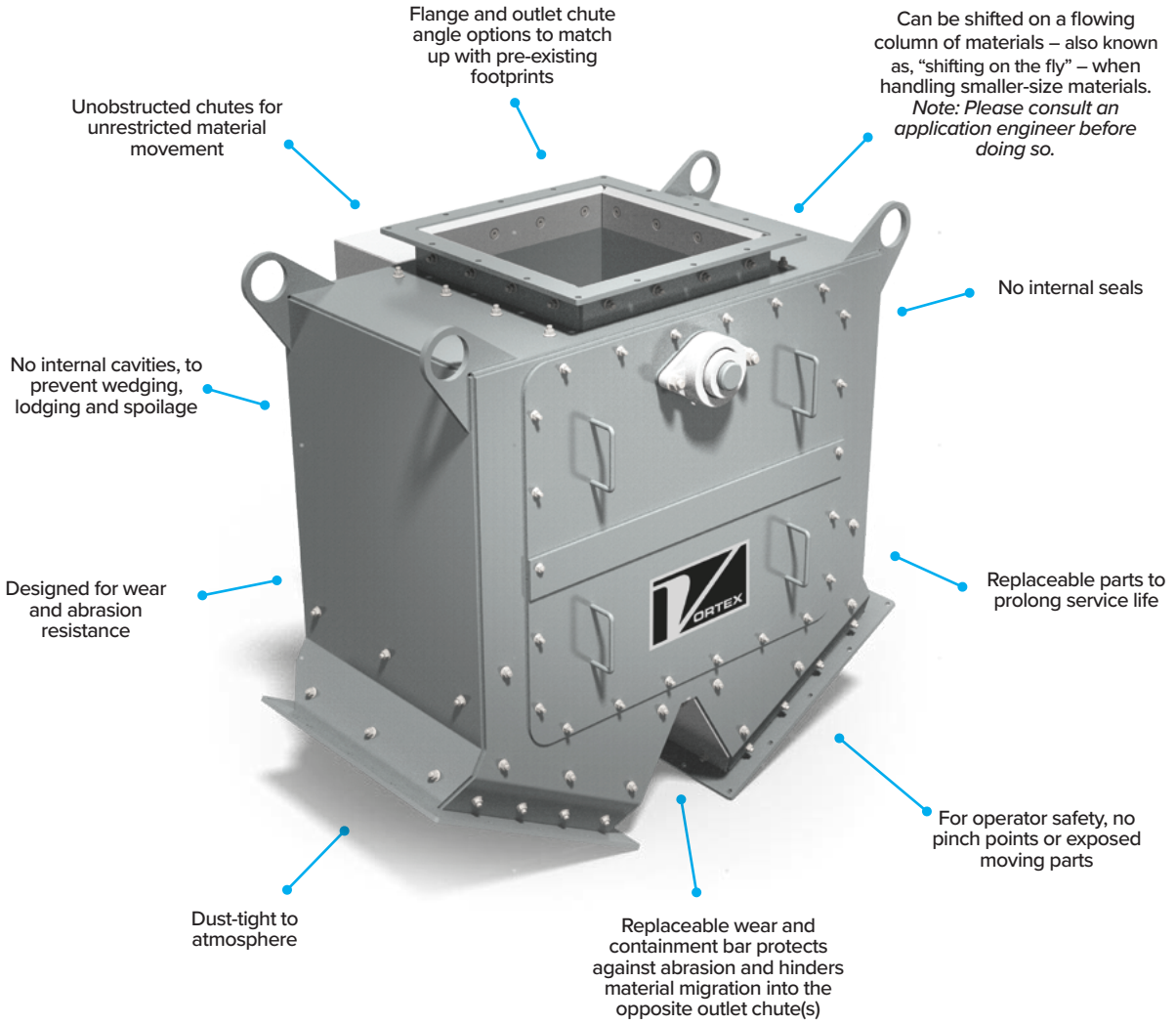
PIVOTING CHUTE DIVERTER

Ideal application: Used to divert heavy-duty and/or abrasive dry bulk solid materials from one source toward two or three destinations in gravity-fed applications.

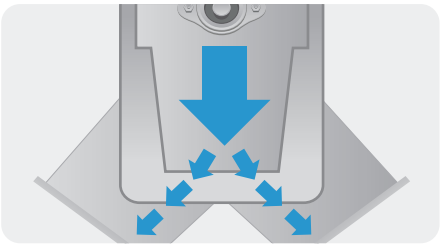
Purpose: The Vortex® Pivoting Chute Diverter™ offers in-line maintenance features, durable materials of construction, reduced downtime, prolonged service life and many other significant advantages over flap diverters and bucket diverters.



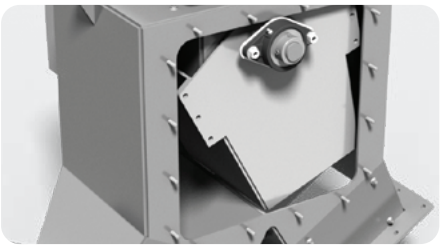
Two-Way | Straight Leg | Three-Way



KEY FEATURES



Can be used to split flow



Removable access panel for in-line inspection and maintenance

Inlet chute to better direct material flow through the pivoting chute

TECHNICAL SPECIFICATIONS

Conveyance Type	Gravity flow only
Materials Handled	Heavy-duty and/or abrasive dry bulk solid materials
Standard Sizes	6 – 24 in | 150 – 600 mm Contact us for custom sizes
Inlet & Outlets	Available in square or rectangular sizes. Round transition options are available (see page 67)
Overall Height	29 1/2 – 80 in | 750 – 2,030 mm
Weight	425 – 3,600 lb | 195 – 1,635 kg
Outlet Angle Options	30° or 45° from center Contact us for custom angles
Flange Options	Standard flange, ANSI #125/150, DIN PN10 Custom flanges are available
Material Temperatures	Up to 400°F | 205°C
Body/Frame Construction	Carbon steel
Chute Options	400 BHN abrasion-resistant steel, chromium carbide
Material Contact Options	400 BHN abrasion-resistant steel, chromium carbide
Liner Options	400 BHN abrasion-resistant steel, chromium carbide
Drive/Actuation	Double-acting air cylinder, electric actuator (see pages 61 & 62)
Position Confirmation	Magnetic reed or proximity switches (see page 63)
Other Options	Spin knobs (see page 68)
Compliance	ATEX Zone 20 (internal), ATEX Zone 21 (external), FDA

KEY FEATURE: Wear & Containment Bar

- The wear and containment bar is exclusive to the Vortex® Pivoting Chute Diverter™. Because the Pivoting Chute Diverter does not have any internal seals, material migration and dusting into the opposite chute(s) is possible. To reduce this risk, the Pivoting Chute Diverter is designed with a replaceable wear and containment bar at the interior juncture between the diverter's outlet chutes. This aids in directing errant materials through the desired outlet, rather than migrating into the opposite chute(s). Its chromium carbide construction also protects against wear and abrasion from the material handled.

THE POWER OF COMPARISON

Vortex Pivoting Chute Diverter vs. Alternatives

- Many alternative gravity-fed diverters have sealed bodies, which limits interior access. In order to perform inspection and/or maintenance, the diverter must be removed from the process line so that its internal mechanisms can be accessed. This can lead to expensive and extensive production downtime. To allow in-line inspection and/or maintenance, the Vortex® Pivoting Chute Diverter™ is designed with a removable access panel that can be removed using simple tools. This feature is especially beneficial in abrasive applications where frequent interior access is required for wear part maintenance. The removable access panel feature significantly reduces downtime by accelerating the maintenance process.

- Many alternative gravity-fed diverters are constructed from less durable metal materials of construction. When handling heavy-duty and/or abrasive dry bulk solid materials, rapid wear and abrasion will result in frequent maintenance and diverter replacement. To address this concern, the body of the Pivoting Chute Diverter is constructed from carbon steel. For added protection, the Pivoting Chute Diverter features replaceable abrasion-resistant wetted parts. By using abrasion-resistant wetted parts, it ensures materials are abrading upon replaceable parts, rather than wearing the underlying material contact areas. The addition of abrasion-resistant wetted parts significantly prolongs a diverter's service life.

- Many alternative gravity-fed diverters are designed with irreplaceable wetted parts. Once a primary wetted part is worn significantly, the entire diverter must be replaced. To resolve this cost-effectiveness issue, the Pivoting Chute Diverter is designed with replaceable wetted parts that can be accessed in-line. This includes actuator, pivoting chute, inlet chute, wear and containment bar, and the abrasion-resistant liners, among others. If maintained and operated as recommended, these should be the diverter's only wear parts. In several cases, this has allowed a Pivoting Chute Diverter to remain in service for many years – and sometimes, even decades.

- Flap diverters should not be shifted through a flowing column of material. Doing so can damage the blade and blade shaft. Instead, it is recommended to shut off material flow before shifting the flapper blade. To do so often requires an additional isolation gate above the diverter valve. Oppositely, the Pivoting Chute Diverter is designed to "pivot" so that it can direct materials toward many destinations without significantly altering the flow path. When handling smaller-size materials, this allows the Pivoting Chute Diverter to be shifted through a flowing column of material. When handling larger-size materials, an isolation gate would still be necessary – or the diverter must be between runs – before shifting the Pivoting Chute Diverter's "pivoting" chute. Contact us to discuss further recommendations.

- Because the flapper blade and seals would be directly exposed to wear and abrasion from the material flow stream, flap diverters should not be used to split flow. The Pivoting Chute Diverter is compatible with Vortex's many material flow control assemblies, to accommodate blade actuation into several intermediate positions. This allows total flow control toward a single destination, or split flow toward two destinations.

- For larger valve sizes, the Pivoting Chute Diverter can be modified to accommodate optional chute removal assist rods. These allow the heavy chutes to be slid out of the valve for easier handling during inspection, maintenance or replacement. If this option is selected, the chute removal assist rods will come factory supplied.

For more information and technical resources please visit: **www.vortexglobal.com**

CASE STUDY

Gates Used in Cement Production

End Product: Cement/mortar ready mix

Valves:
• 6 Aggregate Gates
• 5 Titan Slide Gates

Special Features:
• Material contact areas constructed from 400 BHN AR steel, to address the abrasiveness of cement materials.
• Gate body constructed from carbon steel.

Application:
All gates are installed below surge hoppers.
• The Aggregate Gates are used to feed sand into a mixer.
• The Titan Slide Gates are used to feed mortar mix onto a scale. Once weighed, the mixes are packaged in 5-gallon bulk bags and buckets.

Results: The Aggregate Gates were installed in 2006. The Titan Slide Gates were installed in 2015. Since then, the gates have required no maintenance.

CASE STUDY

Titan Series Handling Industrial Sand

Applications:
• Diverting from an initial duct line toward various production processes.
• Diverting into screeners. Sand is sized and transferred into holding bins.
• Process gates below each holding bin, for truck loadout.
• Maintenance gates throughout the process, for upset condition or if downstream maintenance is required.

Valves:
• 17 Pivoting Chute Diverters
• 9 Titan Lined Diverters
• 5 Titan Slide Gates
• 14 Titan Maintenance Gates

Special Features:
• Material contact areas constructed from 400 BHN AR steel, to address the abrasiveness of sand.
• Titan Slide Gates modified for fine material handling
• Diverters feature round inlet/outlet transitions with ANSI patterns.

CASE STUDY

Titan Lined Diverter Handling Raw Grains

End Product: Animal feed

Special Features:
• Three-way diverting
• Material contact areas constructed from 400 BHN AR steel, to address the abrasiveness of raw grains.
• Replaceable abrasion-resistant liners.

Application: Divert raw grains toward a pelletizing process.

CASE STUDY

Titan Slide Gate Handling Roofing Granules

Special Features:
• Diamond-shaped inlet (pictured upper right)
• Blanchard-ground V-notch blade (pictured lower right)
• Infinite variable positioner (IVP) for +/- 2% positioning accuracy on the opening and closing strokes.
• Electric actuator for improved variable positioning accuracy.
• Blade & inlet constructed from chromium carbide.

Application: Accurate metering of roofing granules helps achieve uniform coloring in asphalt shingles. Roofing granules block ultraviolet (UV) rays and protect the shingle from its environment.

TECHNICAL ARTICLE

Techniques for Preventing Wear & Abrasion

The Physics: Conveying Abrasive Materials
Whether it be a gravity flow or pneumatic conveying application, the physics of dry bulk material movement will significantly impact the degree of wear a system is subjected to. Process engineers must ask themselves: "What areas of the system are most susceptible to wear and abrasion?" This will guide system design, in order to protect those areas.

Generally speaking, a system's highest degree of wear will likely be in areas where material flow pattern and/or air pressure are subjected to dramatic change or disruption. This includes elbows in system ductwork, directional changes from diverting or converging, sudden halt in material flow, aspiration of displaced air, and many other variables in system design.

Depending on application parameters, several techniques can be utilized to protect the system from rapid wear and abrasion.

1. Materials of Construction
When handling abrasive dry materials, a valve's material contact areas should be constructed from robust metals. This includes carbon steel, various grades of AR steel, and chromium carbide, among others.
Several gauges of steel exist; so when selecting valve materials of construction, you must first assess the handled material's characteristics. This will help determine which Brinell Hardness Number (BHN) of steel is necessary to withstand abrasion from the material handled.

2. Diverter Angles
A material's flowability has much to do with its bulk density. These variables can also play into the severity of wear and abrasion.

In gravity flow applications, certain materials achieve optimal flow rates if they are processed through a diverter with steeper outlet leg angles. If a diverter has more subtle outlet leg angles (approximately 45° from vertical), material velocity will slow. This causes materials to "drag" along the bottom of the diverter as they flow through. Alternatively, steeper angles (approximately 30° from vertical) are typically used to flow heavier, denser materials. With steeper outlet angles, material is able to suspend and flow freely through the channel. This reduces the likelihood of material plugs. Additionally, when materials are suspended, materials make little contact with the diverter and thus, it is subjected to less wear and abrasion.

3. Abrasion-Resistant Liners
The material contact areas in flap diverters and bucket diverters, as well as the inlet in slide gates, can be protected with replaceable abrasion-resistant liners. Abrasion-resistant liners are often constructed from robust metals, such as carbon steel, various grades of AR steel, or chromium carbide, among others. In some applications, rubber and polymer liners are more effective materials for abrasion resistance. While the valve's material contact areas may be capable of handling the abrasion, abrasion-resistant liners ensure materials abrade upon replaceable parts, rather than the valve itself. This significantly extends the valve's service life. For return-on-investment purposes, abrasion-resistant liners are a great value because they are the difference between maintaining replaceable parts or replacing a whole valve.

Rock Box/Honeycomb Liners
Specific to bucket diverters, a honeycomb ("rock box") design allows materials to accumulate in specially designed areas along the blade and outlet legs — so that material impacts upon itself as it flows, rather than continuously abrading upon the diverter's mechanical parts. This decreases wear and prolongs a diverter's useful life.

4. Replaceable Parts
Vortex slide gates and diverter valves all feature replaceable parts to significantly prolong service life. In Vortex gravity diverters, a removable access panel allows inspection and maintenance to be performed while the diverter remains in-line.

5. Straight Leg Diverting
In A-style diverters, rapid wear and abrasion is a concern because as materials flow through the inlet, they often make direct impact where the outlet legs meet.In flap-style diverters, this form of abrasion can cause significant damage to the blade shaft and to the outlet legs. For pneumatic conveying diverters, such as the Vortex Wye Line Diverter, this form of continuous abrasion will rapidly wear through the valve's inlet, leaving holes in the valve body. If left unaddressed, holes in the valve body will facilitate material leakage and – in pneumatic conveying applications – air loss.

To avoid continuous abrasion to the inlet, diverters can instead be constructed using a straight leg (K-style) design. The K-style diverting design is preferred because it allows a straight-through channel for material flow. This also makes it so that the outlet legs do not meet in the direct path of travel as materials flow through the inlet.

Generally, A-style diverters are used when similar material quantities are being diverted toward each destination. Oppositely, K-style diverters are generally used when the majority of materials are being routed toward a single destination.

Which Techniques are Best?
Selecting proper equipment is critical to the success of any manufacturing process. Misapplied components and deficient designs can cause unexpected maintenance costs and process inefficiencies that negatively impact a company's overall profitability and performance.

The characteristics of dry bulk materials are endless, so there is no all-encompassing solution for every application. Opinions on these concepts differ, so it is advised to consult with industry professionals to determine which valve designs are most suitable for use in your specific application.

With more than 300 years of combined experience in the dry bulk material handling industry, Vortex application engineers will develop the right solutions for even the most demanding applications.