QUANTUM SERIES
VALVES FOR DRY BULK PROCESSING & CONVEYING
For 35 years, Vortex has supplied dry material handling valves to a global network of Original Equipment Manufacturers, Fortune 500 companies, and process engineering firms. Throughout the world, over 10,000 factories have utilized Vortex’s innovative slide gates, diverters, iris valves, and custom engineered products to improve process efficiency. With sales and service offices located in North America, Europe, Asia & Latin America, Vortex’s success comes from a philosophy that focuses on quality, timely customer service and dedication to adding value to our clients’ processes.

Each Vortex valve is appropriately selected to meet the demands in every application. With an in-house team of engineers, Vortex valves can be completely customized for individual applications or special installations. Vortex understands the value of your process. Our technical application and engineering team have more than 150 years of combined dry material handling experience. Vortex’s knowledge of dry particle characteristics and material conveying systems is unsurpassed. Vortex delivers intelligent and cost-effective valve solutions for all dry bulk materials. No application is too large, too small or too difficult to handle.

MARKETS SERVED:
- Chemicals
- Cement
- Food & Grain
- Fibers
- Minerals
- Petrochem
- Pharmaceutical
- Plastics/polymer
- Rubber
- Mining

Our Quantum Series valves handle many types of dry bulk materials throughout numerous industries that include but are not limited to: Agriculture, Chemical, Coffee, Dairy, Foods, Milling, Pet Food, Petrochemical, Pharmaceutical, Plastics, Rubber, Textiles, Tobacco, and Wood.
Vortex Quantum Series slide gates and diverters are the valves our customers have been using for years to shut off, meter, & divert their dry bulk material. It is our traditional line used for dry bulk processing through gravity flow or pneumatic (pressure or vacuum) conveying.

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### VALVE PLACEMENT

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The Vortex Quantum Orifice Gate is specifically engineered to handle dry bulk solids in gravity flow, dilute phase, or vacuum conveying systems with pressures up to 15 psig (1 barg). Traditional slide gates and butterfly valves commonly allow packing of material which prevents positive air and material shutoff.

**Features**

- Handles powders, granules and pellets
- Mechanically self cleans on opening stroke
- No pinch points or exposed moving parts for safe operation
- Wear compensating hard polymer seals
- Unobstructed opening
- Seals protected from blast abrasion
- Serviceable while in-line
- Material construction options available
- Standard sizes: 2” - 16”
  Contact us for custom sizes

**Applications**

- GRAVITY FLOW
- DILUTE PHASE PNEUMATIC CONVEYING (Pressure or Vacuum)
- DENSE PHASE PNEUMATIC CONVEYING
STUDDED

Shim removal for seal adjustment while valve is in-line

10” (254mm) Quantum Orifice Gate handling cement powder

12” (305mm) Quantum Orifice Gate handling polyethylene resin powder

ORIFICE GATE

For a complete list of specifications, modifications, dimensional drawings and measurements, visit WWW.VORTEXVALVES.COM
The Vortex Roller Gate is the best choice for handling dry material in gravity flow applications. This gate is available in a wide variety of configurations including rectangular sizes and customer specific hole patterns. It has live-loaded seals that extend service life by compensating for wear. These seals provide an excellent material seal across the gate and to atmosphere. They can also be replaced while the valve is in-line.

**Features**

- Handles powders, granules and pellets
- Positive seal of dust and fine powders
- Wear compensating hard polymer seals
- Serviceable while in-line
- Seal access ports for seal replacement while valve is in-line
- Accurate metering of material with optional controls
- No pinch points or exposed moving parts for safe operation
- Material construction options available
- Standard sizes: 4” - 30”
- Contact us for custom sizes

**Gravity Flow**

**Dilute Phase pneumatic conveying** (Pressure or Vacuum)

**Dense Phase pneumatic conveying**
The bonnet seals can be replaced while in-line to decrease downtime.

A special service inlet can be added to deflect material away from seals and rollers to reduce wear.

Top blade seal & cam adjustable rollers supply smooth linear actuation and in-line adjustments.

13” (330mm) Roller Gate below a screw conveyor.

6” (152mm) Roller Gate below hopper handling flour.

26” (660mm) Dual Cylinder Roller Gate.

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com.
Designed to address higher-pressure applications up to 75 psig (5barg) depending on size, the Vortex HDPV2 sets itself apart from traditional industry slide gates. The rising blade design provides positive material shut-off by means of an O-ring seal on the inlet of the valve. This design feature eliminates the issues related to packing or material causing abrasion to the end seal.

- **GRAVITY FLOW**
- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)
- **DENSE PHASE PNEUMATIC CONVEYING**

### FEATURES

- Designed to handle abrasive and sticky materials
- Seals fine material in higher aeration or pressure applications
- Patented rising blade action ensures optimal seal
- Seals protected from blast abrasion
- Serviceable while in-line
- Does not pack material up closure
- Material construction options available
- Standard sizes: 4” - 16”
  Contact us for custom sizes
The silicone blade seal is recessed to protect it from material flow and to reduce wear.

The air purge is used to pressurize the bonnet and keep material in the flow stream.

Lifting lugs and inserts provide a positive seal and prevent metal-on-metal contact.

16" (406mm) HDP above airlock handling calcium oxide

10" (254mm) HDP in-line handling fly ash

12" (305mm) HDP above and below a pressure pot handling PRB coal and wood chips

For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
The Vortex Clear Action Gate is designed for use in gravity flow or pneumatic conveying systems up to 15 psig (1 barg) depending on size. Mounted horizontally, the machined square-edged blade of this gate mechanically clears the material from the sealing surfaces on each closing cycle allowing it to discharge beneath the valve. Open cavities where material collects in traditional gate valves have been eliminated with the square blade and seal design.

**FEATURES**

- Self-cleaning action on closure minimizes material build-up
- Positive seal across the valve and to atmosphere
- Serviceable while in-line
- Accurate metering of materials with optional metering controls
- No internal cavities for material build-up
- No pinch points of exposed moving parts for safe operation
- Material construction options available
- Standard sizes: 6” - 16” Contact us for custom sizes
Slotted end seal to eliminate material packing upon closing stroke

Replaceable bonnet seals allow for in-line maintenance

Air purge ports are used to reduce material migration between replaceable seals

10” (254mm) Clear Action Gate below hopper handling animal feed additives

12” (305mm) Clear Action Gate above a rotary valve handling calcium carbonate with optional pre-wired terminal box

For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
The Vortex Maintenance Gate is designed to shut off material from a hopper or silo when maintenance of downstream equipment is required. In the open position, it positively seals conveying air and material to atmosphere. The hand crank gearing is designed to close through material in case of an upset condition.

- **GRAVITY FLOW**
- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)
- **DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**

- Handles powders, granules and pellets
- Self-cleaning action on closure eliminates material build-up
- Unobstructed opening
- Seals protected from blast abrasion
- Serviceable while in-line
- Narrow profile
- Material construction options available
- Standard sizes: 6” - 18”
- Contact us for custom sizes
Braided Teflon packing seal gives positive material & air seal up to 15 PSIG to atmosphere in the open position.

Ratio of 5:1 ACME threaded rod provides the ability to cut through a column of material in an upset condition.

8" (203mm) Maintenance Gate utilized as overflow shut off on silo.

12" (305mm) Maintenance Gate above a rotary airlock handling soda ash.

10" (254mm) Maintenance Gate handling PVC resin.

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com.
The Vortex Hand Slide Orifice Gate is designed specifically to handle dry bulk solids in gravity flow conveying. A full flow orifice provide unrestricted conveying of material with no disk or ledges to impede flow or cause material bridging. The gate seat and live-loaded seals are protected from material flow by a metal insert. By design, the valve “self cleans” material from the seat on each stroke of the valve blade improving overall seat life.

- **GRAVITY FLOW**

- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)

- **DENSE PHASE PNEUMATIC CONVEYING**

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**Features**

- Handles powders, granules and pellets
- Mechanically self cleans on opening stroke
- Wear compensating hard polymer seals
- Unobstructed opening
- Seals protected from blast abrasion
- Narrow profile
- Material construction options available
- Standard sizes: 2” - 16”

Contact us for custom sizes
Optional locking pin secures the blade in either the open or closed position

Shim removal for seal adjustment while valve is in-line

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com

6” (152mm) Hand Slide Orifice Gate as isolation valve above a flexible screw conveyor
The systems below reflect potential valve placement and are for demonstrational purposes only.

DILUTE PHASE

WYE LINE DIVERSERS - 2 WAY STRAIGHT LEG

WYE LINE DIVERTER 3 WAY

CLEAR ACTION GATES

FILL PASS DIVERSERS

ORIFICE GATES

ROLLER GATES

DENSE PHASE

FLEX TUBE DIVERTER 2 WAY

HDPV2

HDPV2

HDPV2
The systems below reflect potential valve placement and are for demonstrational purposes only.

For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
The Vortex Seal Tite Diverter is designed for use in gravity flow applications where material can be diverted from one source to either two or three destinations. The Seal Tite Diverter offers a removable access door for interior inspection, cleaning and maintenance.

- GRAVITY FLOW
- DILUTE PHASE PNEUMATIC CONVEYING (Pressure or Vacuum)
- DENSE PHASE PNEUMATIC CONVEYING

FEATURES

- Handles powders, granules and pellets
- Leading edge of blade protected from material flow
- Wear compensating shaft seal prevents leakage
- Removable access door for internal inspection, cleaning and maintenance
- Positive seal of dust and fine powders
- Available in 2 and 3-way configurations
- Internal access without tools
- Material construction options available
- Standard sizes: 4” - 30” Contact us for custom sizes
The recessed blade protects the leading edge of seal from material flow and eliminates excess wear.

A removable blade allows for seal replacement without extracting the valve from service.

The shaft seal replaces the open area where migration of material to the off leg normally occurs.

24" (610mm) straight line Seal Tite Diverter handling DDG

6" (152mm) Seal Tite Diverter handling flour

10" (254mm) straight line Seal Tite Diverter handling kaolin clay

For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
The Vortex Quantum Series Wye Line Diverter is specifically engineered to handle dry bulk solids in vacuum or dilute phase pneumatic conveying systems with pressures up to 15 psig (1 barg) depending on size. A full flow orifice provides unrestricted conveying of material. The live-loaded seals are shielded from abrasion by a metal insert.

- **GRAVITY FLOW**
- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)
- **DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**
- Handles powders, granules and pellets
- Shifts “on the fly”
- Wear compensating hard polymer seals
- Unobstructed opening
- Positive seal through closed port
- Serviceable while in-line
- Diverts or converges material flow
- Available in 2, 3, or 4-way configurations
- Material construction options available
- Standard sizes: 2” - 12”
  Contact us for custom sizes
For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
Unlike common in-line flap or plug-type diverters, Vortex’s series of Wye Line Diverters offer a wider range of dilute phase and vacuum conveying options. The design features a stainless steel sliding blade with unrestricted flow ports, and is capable of shifting directions while the system’s blower or vacuum pump continues to operate. If installed near a destination point, the diverter may also shear through material to facilitate continuous conveying.
DETAILS

Compact lightweight design

Ability to shift “on the fly” without requiring blower shutdown

Shim removal for seal adjustment while valve is in-line

Full port opening eliminate internal ledges that can trap material

APPLICATIONS

2.5” (63mm) Wye Line Diverter handling dry leaf tea

6” (152mm) schedule 10 pipe Wye Line Diverter handling kaolin clay powder

4” (101mm) Wye Line Diverter handling polypropylene pellets

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com
The unique design of the Vortex Flex Tube Diverter eliminates material cross contamination through a positive seal across the closed port. Pockets where material can lodge and remain trapped have also been eliminated. A smooth unobstructed transition from inlet to outlet shields the wear compensating seals from abrasion.

- **GRAVITY FLOW**
- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)
- **DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**

- Handles powders, granules and pellets & is excellent for sugar-based solids
- Eliminates cross contamination
- Diverts or converges material flow
- Unobstructed opening
- Available in 2 or 3-way configurations
- No pinch points or exposed moving parts for safe operation
- Material construction options available
- Standard sizes: 2” - 8”
  Contact us for custom sizes
FLEX TUBE DIVERTER

2 - WAY

3 - WAY

Housing encloses all moving parts to eliminate external pinch points and support the flex tube.

Shim removal for seal adjustment while valve is in-line.

This diagram shows the isolation of the off leg to eliminate material cross contamination.

8" (203mm) Flex Tube Diverter handling PVC compound.

6" (152mm) Flex Tube Diverter handling coffee beans.

For a complete list of specifications, modifications, dimensional drawings and measurements, visit WWW.VORTEXVALVES.COM.
The Vortex Gravity Vee Diverter is designed to divert dry bulk solids in gravity flow conveying systems. The design allows for material flow through both outlets simultaneously, one outlet at a time, or a complete shut-off of flow. The Gravity Vee Diverter is also capable of metering flow through either outlet port.

- **GRAVITY FLOW**
- **DILUTE PHASE PNEUMATIC CONveying**
- **DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**

- Handles powders, granules and pellets
- Design allows for total material flow control
- Wear compensating hard polymer seals
- Seals protected from blast abrasion
- Positive seal of dust and fine powders
- Serviceable while in-line
- Material construction options available
- Standard sizes: 5” - 24”
- Contact us for custom sizes
Multiple actuators allow for independent control of material flow through each outlet.

The bonnet seals can be replaced while valve is in-line.

8" (203mm) Gravity Vee Diverter below a rotary valve handling zinc oxide.

24" (610mm) Dual Cylinder Gravity Vee Diverter for handling flour.

For a complete list of specifications, modifications, dimensional drawings and measurements, visit WWW.VORTEXVALVES.COM.
The Vortex Fill Pass Diverter is specifically engineered to handle dry bulk solids in vacuum or dilute phase pneumatic conveying systems with pressure up to 15 psig (1 barg) depending on size. It provides a versatile and reliable solution for filling one or more in-line weigh hoppers when material is conveyed pneumatically through a closed loop system. The design of the Fill Pass Diverter utilizes spread hopper inlet/outlet stacks for improved air and material separation reducing fill time and down line material carryover.

- **GRAVITY FLOW**

- **DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)

- **DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**

- Separates air and material before filling the hopper
- Shifts “on the fly”
- Weigh from up to 5 sources and/or materials
- Positive seal through closed ports
- Unobstructed opening
- Serviceable while in-line
- Material construction options available
- Standard sizes: 2” - 6” Contact us for custom sizes
Shim removal for seal adjustment while valve is in-line

The valve’s spread stack offers better material/air separation

The material deflector directs material flow to minimize material carryover

5” (127mm) Fill Pass Diverter above a scale hopper handling calcium carbonate

6” (152mm) Fill Pass Diverter above a scale hopper handling baking mixtures

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com
STACKABLE **FILL PASS** DIVERTERS and their placement in a closed loop pneumatic system

**FILL** MODE

Conveyed material and air into scale hopper and back to source

**PASS** MODE

Conveyed material and air passes hopper when weight or volume is attained

**BLUE** represents airflow toward hopper  **RED** represents airflow away from hopper
STACKABLE **FILL PASS DIVERTERS**
are used to batch different materials using two separate systems into multiple hoppers

**PRODUCT BENEFITS**
- Positive seal in pass mode reduces material carryover
- Material and air separation also reduces material carryover
- Less carryover means faster hopper fill times
- Positive seal also results in more accurate batching
- Hopper is vented as it fills eliminating the need for a bin vent
- Stacked Fill Pass Diverters reduce required footprint

1. Air and material X move toward hopper in line 1
2. Air and material X are diverted down into hopper
3. Material X is deflected away from vent as it fills the hopper
4. Air is vented back in-line with minimal material carryover
5. Air pressure continues in-line with minimal material carryover
6. Air and material Z in line 2 move pass hopper when in pass mode

**LINE 1: Fill Mode**
- **BLUE** represents airflow toward hopper
- **RED** represents airflow away from hopper

**LINE 2: Pass Mode**

For a complete list of specifications, modifications, dimensional drawings and measurements, visit [WWW.VORTEXVALVES.COM](http://WWW.VORTEXVALVES.COM)
The Vortex Multi-Port Wye Line Diverter is specifically engineered to handle dry bulk solids in vacuum or dilute phase pneumatic conveying systems with pressures up to 15 psig (1 barg) depending on size. The multi-port eliminates the need for complicated hose manifold stations. This helps address potential errors when manually switching hoses and greatly reduces safety hazards.

**FEATURES**

- Handles powders, granules and pellets
- Mechanically self cleans on opening stroke
- Shifts “on the fly”
- Wear compensating hard polymer seals
- Unobstructed opening
- Serviceable while in-line
- Material construction options available
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MULTI-PORT DIVERTER VORTEX VALVES

2 x 8 Multi-Port Diverter handling PVC compounds

4” (102mm) Cross-Over Diverter handling titanium dioxide

2 x 8 Multi-Port Diverter handling plastic pellets

5 x 5 Multi-Port Diverter with all lines running simultaneously handling plastic resin

For a complete list of specifications, modifications, dimensional drawings and measurements, visit WWW.VORTEXVALVES.COM
The Vortex Iris Valve is designed specifically to handle dry bulk solids in gravity discharge of free-flowing material from bins, bulk bags, chutes, and hoppers. The Vortex Iris Valve is designed with stainless steel control rings, metal handle and trigger lock, and nylon shim for durability and smooth actuation. A form fitted fabric sleeve provides a dust tight seal and product barrier that prevents material leakage to atmosphere.

**GRAVITY FLOW**

**DILUTE PHASE PNEUMATIC CONVEYING** (Pressure or Vacuum)

**DENSE PHASE PNEUMATIC CONVEYING**

**FEATURES**

- Handles powders, granules and pellets
- Ideal for bulk bag unloading
- Smooth actuation with no binding or galling
- Unobstructed opening
- Fabric sleeve prevents material degradation
- Stainless steel control ring
- Material construction options available
- Standard sizes: 4” - 18”
  Contact us for custom sizes
Preset positions for quick adjustments of material flow

Stainless steel control ring increases torque when closing on a column of material

Optional replaceable wear liner reduces sleeve contact and extends valve life

12” (305mm) Iris Valve on bulk bag discharge
16” (457mm) Iris Valve on bulk bag discharge
15” (381mm) Iris Valve on bulk bag discharge

For a complete list of specifications, modifications, dimensional drawings and measurements, visit www.vortexvalves.com