

DISCHARGE

# BULK BAG DISCHARGERS



**NATIONAL BULK  
EQUIPMENT®**  
AN NBE COMPANY

FORWARD THINKING | **REAL RESULTS®**



# ENGINEERED-TO-APPLICATION PROJECT DELIVERY

## Advancing Bulk Bag Discharger Performance & Project Delivery

Facility requirements and space constraints. Material characteristics and handling considerations. Bulk bag styles and specifications. Process demands and integration. These are the high-level aspects typical of every bulk bag discharging application. Optimizing the results of bulk bag discharging projects requires detailed analysis of these factors. This is why NBE pioneered engineered-to-application project delivery. This process leverages the NBE fullstream applications expertise with custom design and manufacturing proficiencies to ensure optimal process performance; from initial material testing through start-up and commissioning.

NBE recognizes standard or modular design results in sub-optimal, force-fit solutions. Instead, NBE designs each bulk bag discharger to the details of each different facility, bag, product, and process. The pages that follow show the results of this approach across a sampling of applications.

### Upstream Process Confidence Ensuring Downstream Results

Bulk bag discharging equipment, systems, and projects from NBE are engineered-to-application to provide exceptional performance to processing and packaging lines with demanding requirements for throughput, rate, and yield. The NBE Innovation Center & Application Workshop enable proof-of-application performance. This is where NBE experience and innovation are combined to solve unique customer challenges. Materials are tested with application-specific parameters replicated using the NBE portfolio of test equipment. Science-based material testing in the NBE Analytical Laboratory evaluates material characteristics and flow properties ensuring results are based on performance findings from a fullstream process context.

### Fullstream Project Capabilities Deliver Fullstream Performance

NBE bulk bag dischargers enable dry bulk material processing operations to efficiently discharge even the most challenging materials, while optimizing operator-equipment interaction, protecting product from contamination, and reducing dusting and material loss. NBE engineered-to-application design and automation ensure highly reliable performance and increased availability. The NBE fullstream advantage ensures tangible and comprehensive process improvement from supply to packaging.



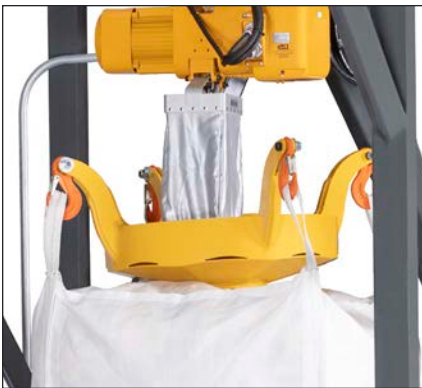
# Pelletized Material. Free-flowing Material. Loss-in-Weight.

- Achieve Optimal Discharge Where Headroom is Limited
- Control Handling & Discharge of Free-flowing Materials
- Ensure Efficient Material Supply to Downstream Processes
- Simple Design with Maximized Operator Availability

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Bag Spout Untie Box:** Contain material with an enclosed bag spout. Integrated flow control valve and application-specific downstream interconnect enable effective material discharge and supply. Toggle-action door handle provides dust-tight seal.



**Low-profile Bag Hanger:** Reduce total equipment height and enable integration of application-specific sub-assemblies. Raised bag hanger arms, offset from the contaminant guard, optimize bag hanging height and reduce headroom requirements.



**Bulk Bag Support Pan:** Maintain bulk bag stability and bag spout alignment during discharge of free-flowing materials. Sloped bag support pan directs material toward bag spout interface; enables safe operator access to bulk bag discharge spout.



**Bulk Bag Empty Alert System:** Support continuous operation with bag empty visual alerts. Loss-in-weight scales, engineered into the framework, gauge net-weight loss during material discharge. Operator alerts occur when scales reach customizable target weight.



**Low-profile Bag Support Framework:** Maximize available space where low ceilings or headroom obstructions are present. Framework construction provides 4,000-pound capacity, framework design meets or exceeds ANSI and ASME specifications.



**Iris-type Valve:** Designed for use with free-flowing materials, the iris-type flow control valve enables gradual start-up of flow. Manage material flow volume through the bulk bag spout and protect operator's hands from material contact during untying of spout.



# Granular Material. Free-flowing Material. Process Safety.

- Increase Process Throughput & Efficiency
- Maintain Control of Free-flowing Material
- Improve Operator-Equipment Interactions

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Pneumatically Actuated Massage Paddles:** Prevent material waste and reduce manual operator interaction with the bulk bag. Massage paddles direct material from far-corner areas of bulk bag toward discharge spout; operator remains away from bulk bag.



**Frame-mounted Hoist & Trolley Controls:** Locate operator in proper position for designed equipment interaction during raising and positioning of the bulk bag. Hardwired controls are mounted to lower framework in an accessible area out of the path of the bag movement.



**Bag Spout Untie Box:** Enable effective operator spouting of the bulk bag and controlled discharge of free-flowing material to integrated processes. Engineered to interface with downstream process.



**Cross-tube Bag Hanger:** Provide operators a simple yet secure method to hang bulk bags for loading into the discharger. Bag loop retainers keep loops in place, even when not tensioned. Round, tubular hanger arms reduce bag loop wear. Built to ASME specifications.



**Iris Flow Control Valve:** Get gradual and controlled start-up of material discharge even when handling free-flowing product. Multiple flow settings on the valve body enable the operator to preset or adjust material flow rate without contacting material.



**Dedicated-hoist Bag Support Framework:** Achieve high-performance bulk bag loading without relying on forklifts or bridge cranes. Integrated trolley and hoist provide 4,000-pound capacity; framework design meets or exceeds ANSI and ASME specifications.



# Dusty Material. Poor-flowing Material. Process Safety.

- Improve Safety Practices & Compliance Objectives
- Discharge Non-free Flowing Materials at Designed Rate
- Recover & Return Fugitive Dust & Fines into Product Stream
- Automate for Optimal System Efficiency & Availability

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Caging & Access Doors with Interlocked Switches:** Doors with interlocked switches prevent access during operation. Side- and rear-caging mesh design is custom-cut to optimize visibility.



**Controls & Automation:** Increase discharge efficiency and system availability with downstream process integration. Guard doors safety interlocked with automatic massage paddle actuation. Automatic dust collection volume rate controlled by E3 operation or position.



**Integrated Dust Collector:** Utilize integrated dust collection to capture potential dust during spouting and discharge to support a safer and cleaner work environment. Proper routing and filtering of displaced air during discharge enables dust and fines to be reintroduced to material stream.



**Automatic Massage Paddles:** Ensure proper discharge and designed supply of non-free flowing material to downstream equipment. Automatic, timed cycles of massage paddle actuation are based on signals from downstream systems.



**E3™ Bag Spout Interface:** Achieve complete discharge of non-free flowing, dusty materials. Bag spout is secured within the fully enclosed spout interface to prevent dust release. E3 assembly lowers during discharge to pull bag taut, discharging material from corners. Engage, elongate, and evacuate.



**Pinch Valve:** Pneumatically actuated blades close through static column of material for partial bag unloading. Can compress bag spout to break-up and release large chunks of material that may slow flow rate. Actuated using a two-handed pneumatic safety control circuit.



# Solidified Material. Minors Addition. Material Size Reduction.

- Process Solidified Materials Reliably & Repeatedly
- Ensure Downstream Performance from the Start
- Add Secondary Ingredients Efficiently & Thoroughly
- Operate in Harsh Environments with Confidence

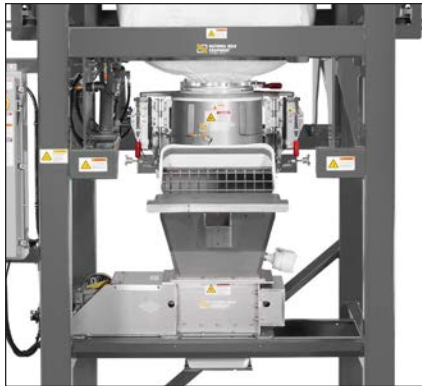
## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Hydraulically Driven Deblocking Rams:** Pyramidal rams provide point loads to fracture solidified material into chunk sizes to discharge through the bag spout. Integrated material deblocking design reduces total bag discharge cycle time compared to free-standing or manual methods.



**Hydraulically Driven Massage Paddles:** Massage paddles are upgraded to hydraulic driven for additional force for the solidified material. Used in conjunction with the rams, material flow is maintained into the downstream processes.



**Minors Addition Station:** Improve operator efficiency and equipment interaction during manual introduction of minor ingredients. Operator-centric design simplifies discharge from bags, pails, or totes. Integrated hopper design ensures all minors are introduced.



**E2™ Bag Spout Interface:** Ensure secure, enclosed interface of bulk bag spout to the downstream process; prevent spout release during material conditioning and discharge. Dust-tight seal prevents material loss and additional clean-up due to fugitive dust. Engage and evacuate.



**Material Lump Breaker:** Dual, counter-rotating agitators with variable-speed drive balance the supply of material to downstream processes. Reduce material size with stationary breaker bars integrated with the agitators for a consistent supply of flow-resistant material.



**Galvanized Rigid Conduit Runs:** Protect system-wide controls, sensing, and monitoring wiring from harsh process environments. Application-based conduit material specifications and routing design extend system availability and reduce maintenance. PVC-coated, aluminum, or stainless steel conduit is available.



# Dusty Material. Poor-flowing Material. Hygienic Environment.

- Bring Process Confidence to Hygienic Environments
- Improve Discharge Efficiency of Challenging Materials
- Reduce Material Loss and Sanitation Concerns
- Deliver High-performance to Low-headroom Location

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Adaptive E3™ Bag Spout Interface:** Ensure dust-tight transfer of material from short-spouted bags to downstream processes and accelerate discharge. Fully enclosed bag spout prevents dusting and material loss during material discharge.



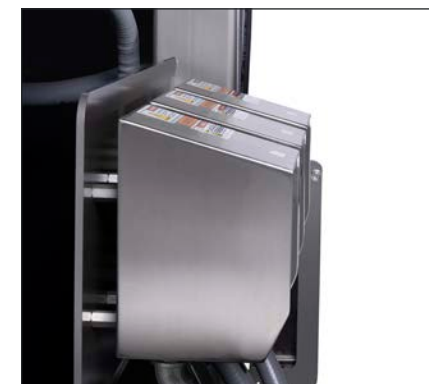
**Quick-Clean Agitator Hopper:** Increase labor efficiency and effectiveness during cleaning or maintenance events; improve process accessibility. Davit door is interlocked for safety and swings open wide for access. Slow-rotating agitation aids material supply.



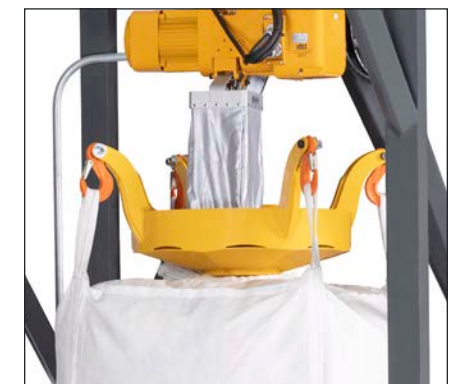
**Pneumatically Actuated Massage Paddles:** Reliable, consistent discharge of non-free flowing material is made possible by simultaneous upward and inward motions of the massage paddles, causing a gradual displacement of material toward the bag spout.



**Operator Platform:** Designed to the specific operator-equipment interaction requirements for each application, operators safely and efficiently access equipment. Hygienic area build specifications aid cleaning, speed changeovers.



**Clean-Design Engineering & Construction:** Sanitary design criteria are engineered into system framework and assemblies to increase changeover efficiencies, gain compliance confidence, and contribute to improved process and product safety.



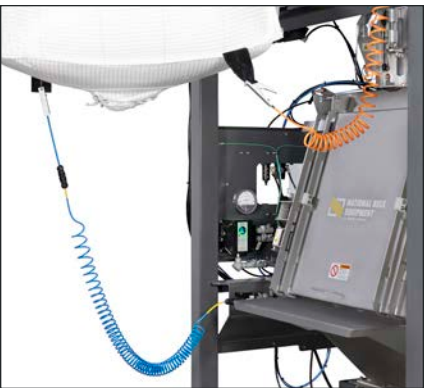
**Low-profile Bag Hanger:** Reduce total equipment height and enable integration of application-specific sub-assemblies. Raised bag hanger arms, offset from the contaminant guard, optimize bag hanging height and reduce headroom requirements.



# Static Grounding Protection. Material Size Reduction. Process Safety.

- Achieve Effective Static Grounding Protection
- Ensure Efficient Supply of Flow-resistant Materials
- Reduce Dusting During Minor Ingredient Addition
- Condition Material for Downstream Process Needs

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Static Grounding Protection for Type C Bulk Bags:** Application-specific features, for Type C bulk bags, work to monitor grounding for effective electrostatic dissipation. Ground monitoring is interlocked into the fullstream process to provide a safe system.



**Pneumatically Actuated Massage Paddles:** Increase material discharge rate, maximize discharge of material from the bulk bag. Based on downstream signals, massage paddles direct material from far-corner areas of bulk bag toward discharge spout.



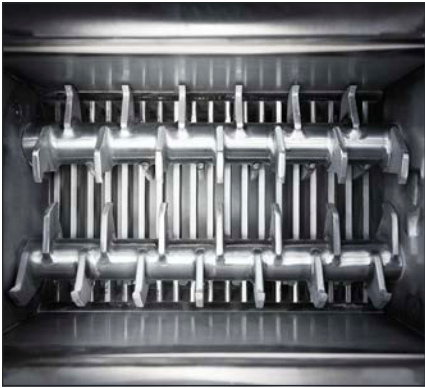
**Controls & Automation:** Customized programming along with components provide safety features to prevent unwanted operator interactions. Integration of grounding monitor, audible and visual alarms, interlocking switches, and level sensors ensure operators follow proper sequences.



**E2™ Bag Spout Interface:** Ensure secure, enclosed interface of bulk bag spout to downstream process; prevent spout release during material conditioning and discharge. Dust-tight seal prevents material loss and additional clean-up due to fugitive dust. Additional cover prevents dusting during minor adds.



**Combination Hopper:** Enable manual addition of ingredients from alternate containers in an ergonomic workstation with bag grate and interlocked door. Integrated baffles inside the hopper allow for dust collection to draw the dust down into the system and away from the operator.



**Material Lump Breaker:** Dual, counter-rotating agitators with variable-speed drive balance the supply of material to downstream processes. Reduce material size with stationary breaker bars integrated with the agitators for a consistent supply of flow-resistant material.





# Dusty Material. Single-use Bulk Bag. High Throughput.

- Reduce Bulk Bag Discharge Cycle Times
- Increase Material Throughput Efficiency
- Return Fugitive Material to Product Stream
- Improve Operating Efficiency & Process Yields

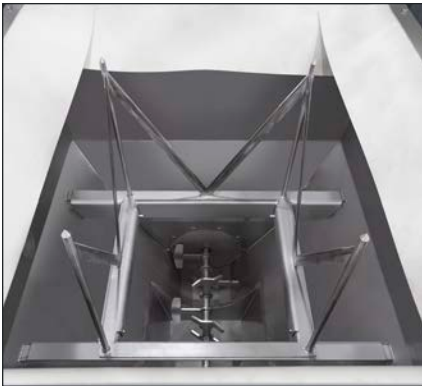
## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Integrated Dust Collection System:** Reintroduce dust and fines to material stream; reduce material loss and facility maintenance. Displaced air and dust, generated at discharge, are routed through dual-cartridge filtering, recovered material returns to material stream.



**Bulk Bag Piercing Hopper with Dust Collection Plenum:** Accelerate material discharge by using spear-and-blade assembly to cut 25-inch flap opening into bag bottom. Full-perimeter dust collection plenum, with gasket, aids dust containment.



**Hopper Agitator:** Provide reliable, consistent material supply to downstream processes, regardless of material flow characteristics. Application-specific agitator design draws material in hopper toward discharge, eliminating material bridging and ratholing.



**Automatic Loop-retractor Bag Hanger:** Ensure complete material discharge from bulk bag. During discharge, bag loop retractors draw bag top corners up and in, forming conical shape from bag spout to bag loops, improving material flow. For optimal discharge efficiency, pair with E3™ Bag Spout Interface.



**Dedicated-hoist Framework:** Improve bag discharge cycle times and repeatability. 4,000-pound capacity frame with trolley and hoist speeds bag loading. Angled planes of framework aid removal of material and moisture. Framework design meets or exceeds ANSI and ASME specifications.



**Controls & Automation:** Custom-engineered solutions ensure efficient delivery to downstream processes. Increase operator efficiency, improve process-wide systems integration. Engineered to deliver optimal rate. Reduces manual intervention and improves operator safety while maximizing throughput.





# Powdered Material. Varying Packaging. Material Flow Aids.

- Advance Downstream Process Throughput
- Optimize Operator-Equipment Interactions
- Properly Manage Minor Ingredient Addition
- Process Varied Materials & Flow Characteristics

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



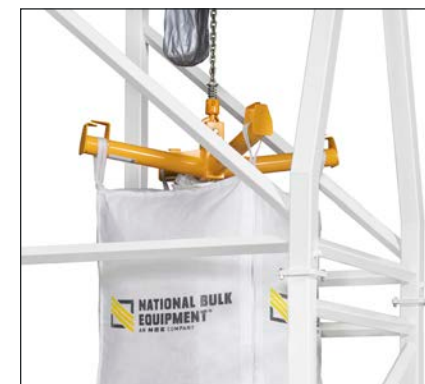
**Pneumatically Actuated Massage Paddles:** Prevent material waste and reduce manual operator interaction with the bulk bag. Massage paddles direct material from far-corner areas of bulk bag toward discharge spout; operator remains away from bulk bag.



**Combination Hopper:** Enable manual addition of ingredients from alternate containers in an ergonomic workstation with bag grate and interlocked door. Integrated baffles inside the hopper allow for dust collection to draw the dust down into the system and away from the operator.



**Surge Hopper:** Maintain sufficient material capacity to ensure continuous supply of product to downstream processes during removal and replacement of empty bulk bag. Application-specific design of hopper slope provides reliable material flow.



**Cross-tube Bag Hanger:** Simplify operator-equipment interaction during hanging and loading of bags. Stationary, counter-directional bag loop retainers secure loops in position, even when loops are not tensioned, and ease removal of empty bag from hanger.



**Dedicated-hoist Bag Support Framework:** Improve bag discharge cycle times, maintain high-volume, downstream material supply without use of forklift or bridge crane. 4,000-pound capacity frame with trolley and hoist enables efficient bag loading rate.



**Air Fluidizer:** Ensure reliable, downstream throughput; avoid material infeed problems caused by non-free flowing product. Mounted in the hopper wall, the pneumatic aerators displace and release compacted material, reducing bridging and ratholing.



# Free-flowing Material. Short-spout Bag. Layout Limitations.

- Bring Clarity & Performance to Complex Processes
- Achieve Optimal Bag Handling & Loading Cycle Times
- Manage Facility & Floorspace Layout Limitations
- Enable Remote-operator Hoist Control

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Bulk Bag Loading Location Sensors:** Enable designed operator interactions for proper loading and handling of bulk bags. Sensors placed along bag support framework rail detect trolley and hoist location to enable or disable local and remote hoist controls.



**Adaptive E3™ Bag Spout Interface:** Ensure dust-tight transfer of material from short-spouted bags to downstream processes and accelerate discharge. Fully enclosed bag spout prevents dusting and material loss during material discharge.



**Long-travel Bulk Bag Loading System:** Reduce cycle times where multi-story handling during bulk bag loading and unloading is necessary. High-performance hoist lift speed and trolley traverse speed offset extended process height and length travel requirements.



**Pneumatically Actuated Massage Paddles:** Reliable, consistent discharge of non-free flowing material is made possible by simultaneous upward and inward motions of the massage paddles, causing a gradual displacement of material toward the bag spout.



**Dedicated-hoist Bag Support Framework with Extended Reach:** Accommodate complex process layout requirements and facility space restrictions. Application-specific framework designs bring high-capacity, long-reach performance to challenging work areas.



**Low-profile Bag Hanger:** Reduce total equipment height and enable integration of application-specific sub-assemblies. Raised bag hanger arms, offset from the contaminant guard, optimize bag hanging height and reduce headroom requirements.



# Quick Clean. Semi-free Flowing Material. Process Safety.

- Improve Operator Accessibility & Guarding
- Reduce Effects of Harsh Operating Conditions
- Increase Material Discharge & Flow Efficiency
- Gain Changeover Efficiency with Clean Design

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Caging & Safety Light Curtains:** Provide machine guarding without limiting visibility or appropriate access to equipment. Presence detection systems improve operator-equipment efficiency compared to mechanical methods, while protecting operators from unintended access.



**E3™ Bag Spout Interface:** Ensure dust-tight interface from bag spout through to downstream equipment interconnect. Clean-design fittings, hygienic materials of construction reduce contaminant build-up and dusting of fine, free-flowing product during discharge.



**Quick-clean Hopper Agitator:** Increase labor efficiency and effectiveness during cleaning or maintenance events; improve process accessibility. Davit door is interlocked for safety and swings open wide for access. Slow-rotating agitation aids material supply.



**Pinch Valve:** Pneumatically actuated blades compress bag spout to break-up and release large chunks of material that may slow flow rate. Can close through static column of material for partial bag unloading. Actuated using a two-handed pneumatic safety control circuit.



**Pneumatically Actuated Massage Paddles:** Increase material discharge rate, maximize discharge of material from the bulk bag. Based on downstream signals, massage paddles direct material from far-corner areas of bulk bag toward discharge spout.



**Surface Coatings for Severe Operating Conditions:** Extend life cycle and reduce maintenance of equipment operating in harsh environments. NBE in-house paint capabilities allow an engineered-to-application selection of coating for specific applications.





# Hazardous Material. Wind & Seismic Load. Non-free Flowing Material.

- Protect Process from Fugitive Dust
- Handle Wind & Seismic Load Requirements
- Manage Explosion Risks in Accordance with Required Standards
- Achieve High-demand Process Supply Requirements

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Dust Containment Frame Enclosure:** Prevent release into surrounding process areas of dust from bulk bag seams and exterior construction. Engineered-to-application polycarbonate panels with air louvers and dust ports enable positive pressure to aid collection and removal.



**Wind and Seismic Load Engineering & Construction:** Manage regulatory matters regarding design and construction of structural members and structural systems as prescribed by code. System framework and sub-structures are built to wind and seismic load resistance requirements.



**Class I Division 2 Engineering & Assembly:** Achieve requirements by utilizing explosion-proof enclosures, cable seals, grounding, and other instrumentation and devices rated for classification. Reduce risk of explosion hazards where hazards may exist due to flammable gases, vapors, or combustible vapors.



**Hydraulically Driven Conditioning Rams:** Ensure continuous discharge of non-free flowing materials that may bridge during handling. Dome-shaped ram faces disperse pressure throughout the bagged material preventing bridging and moving material through bag spout.



**Hydraulically Driven Massage Paddles:** Provide additional force to the massage paddles to assist in moving flow-resistant material toward the bag spout with hydraulic-driven cylinders. Reduce material loss, enable complete discharge of material from far-corner areas of bulk bag.



**Dual-drive Agitator Hopper with Explosion Venting:** High-torque drive systems deliver high-performance materials at specified rates to downstream process systems while addressing material hazards. Engineered-to-application explosion venting is used for process and personnel protection.



# Fluid-like Material. Air Balance Actuation. Integrated System.

- Deliver Process-wide Operational Performance
- Turn Facility Limitations to Process Advantages
- Control Challenging Materials from Start to Finish
- Prioritize Operator Safety, Gain Operator Engagement

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Fullstream Bulk Dry Material Process Integration:** Advance performance of upstream, midstream, and downstream processes. Engineered-to-application, integrated dry material discharging, conveying, and finished-product packaging optimize total cost of ownership.



**Offset Bag Support Framework:** Optimize floorspace where equipment-height obstructions are present. Facility-specific frame engineering and construction enable high-performance discharging regardless of plant layout. Framework provides 4,000-pound capacity.



**Enclosed Dust Recovery System with Air Balance Actuation:** Prevent over-pressurized discharge of material with fluid-like flow by locating the vent stack above the bag height; avoid dust release into work area. Auto-actuated air flow volume controller uses make-up air to balance air circuit during discharge.



**Pneumatically Actuated Massage Paddles:** Increase material discharge rate, maximize discharge of material from the bulk bag. Based on downstream signals, massage paddles direct material from far-corner areas of bulk bag toward discharge spout.



**E3™ Bag Spout Interface:** Ensure dust-tight interface from bag spout through to downstream equipment interconnect. Clean-design fittings, hygienic materials of construction reduce contaminant build-up and dusting of fine, free-flowing product during discharge.



**Operator Platform:** Provide equipment accessibility that encourages proper operator-equipment interaction. Provide machine guarding that enables safety and efficiency. Application-specific designs help reduce personnel fatigue and frustration.





# Dusty Material. Slurry & Solution. Integrated System.

- Leverage In-plant Systems for Bulk Bag Loading
- Improve Dry Solids Supply to Slurries & Solutions
- Automate for Personnel & Process Efficiency
- Bring Proven Performance to Demanding Applications

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Slurry & Solution Material Supply and Processing:** Achieve accurate, repeatable dry solids material supply, regardless of batch- or continuous-duty process requirements. Controlled discharge of material, and metered infeed ensures homogeneous concentrations.



**Integrated Dust Collection System with Actuated Vent Stack:** Avoid loss of material to dusting and unwanted material entrainment during dust collection. Auto-modulation of pick-up air at spout interface reduces product loss during material discharge.



**Frame-mounted Flexible Screw Conveyor Support:** Convey bulk solids at high rate and sustained duty to downstream equipment. Performance-driven design specifications ensure reliable conveying at challenging angles and distances; reducing wear and downtime.



**Controls & Automation:** Ensure optimal process rates and accuracies; improve operator-equipment efficiency. Customized programming provides automation for variable material transfer rates, dust collection, and mixing time. HMI allows for adjustable recipe parameters and settings.



**Operator Platform:** Many applications require an operator platform for ergonomic access. NBE provides customized designs to fit into the framework for close-reach access.



**Customer-supplied Bag Loading System:** Optimize existing crane and hoist systems; ensure effective bulk bag loading. Lower-frame only bag support systems enable safe operator interaction. A variety of bag spout interface methods aid material discharge.





# Gravity Flow. Clean Design. Integrated System.

- Implement Fullstream Process Performance
- Optimize Plant Floor Space & Productivity
- Bring Proactive Protection to Personnel & Product
- Simplify Multi-system Access for Operators

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Fullstream Bulk Dry Material Process Integration:** Achieve process-wide efficiency and throughput improvements. Integrated upstream, midstream, and downstream dry material processes leverage engineered-to-application systems for performance gains.



**Clean-design Engineering & Construction:** Meet demanding requirements for process-specific sanitary design criteria. Engineered-to-application framework features and assemblies increase changeover efficiencies and ensure compliance confidence.



**Gravity-flow Engineering & Construction:** Reduce need for lateral material conveying and transfer; optimize project footprint and facility floorspace. Framework chassis is engineered for top-down flow path; regardless of material flow characteristics.



**Cross-tube Bag Hanger with Contaminant Guard:** Protect product stream from overhead sources of foreign matter. Containment tray offers application-specific, formed planes and channels to collect dry and liquid contaminants; preventing product loss.



**E2™ Bag Spout Interface:** Prevent facility maintenance and material loss from fugitive dust caused during discharge. Ensure dust-tight, enclosed interface of bag spout to process interconnect; avoid spout release during material conditioning and discharge.



**Operator Platform:** Provide operators convenient, safe accessibility to multiple process systems from a single platform. Designed to specific layout needs and operator-equipment interaction points; personnel avoid unsafe reaching and increase effectiveness.



# Slurry & Solution. Clean-in-Place. Minors Addition.

- Achieve Precise Slurry & Solution Solids Concentration
- Make Changeovers an Effective Process Advantage
- Clean-in-Place with Confidence & Efficiency
- Reduce Material Loss, Improve Process Yield

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Slurry & Solution Material Supply and Processing:** Deliver precise, homogeneous concentrations to downstream processes. Controlled discharge, metered infeed, and proper blending of dry solids into the liquid supply enables optimal throughput and yield.



**Controls & Automation:** Ensure optimal rates and accuracies; improve operator efficiency. Custom-programmed batching sequence with intuitive operator interface allows customization of recipes. Optimized automation provides seamless transition between major and minor ingredient additions.



**PVC-coated Rigid Conduit Runs:** Protect system-wide controls, sensing, and monitoring wiring from corrosive process environments and materials. Application-based conduit material specifications and routing design extend system availability and reduce maintenance. Galvanized, aluminum, or stainless steel conduit is available.



**Clean-design Engineering & Construction:** Reduce changeover times and increase cleaning efficiency. Sanitary clamp fittings are engineered into system assemblies to aid disassembly and reassembly.



**Enclosed Dust Recovery System with Air Balance Actuation:** Prevent over-pressurized discharge of material with fluid-like flow by locating the vent stack above the bag height; avoid dust release into work area. Auto-actuated air flow volume controller uses make-up air to balance air circuit during discharge.



**Customer-supplied Bag Loading System:** Utilize facility hoist and crane systems for bulk bag handling and loading into the lower-frame only bag support system. Application-specific bag spout interface enables safe, easy access for operator; prevents dust release.





# Hazardous Location. Slurry & Solution. Inert Atmosphere Process.

- Operate Outdoors with Safety and Efficiency
- Manage Challenging Location and Hazardous Requirements
- Improve Throughput Reliability and Line Yield
- Protect Dry Solids from Humidity During Processing

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Galvanized Carbon Steel Construction:** Protect system framework and sub-structures from degradation caused by harsh environments and materials. NBE customizes framework to withstand the hot-dip galvanizing process.



**Class I Division 2 Hazardous Area Engineering & Assembly:** Enable effective implementation of requirements where hazards may exist due to flammable gases, vapors, or combustible vapors. NEMA 7/9 or purged panels are provided to meet the environment requirements.



**Operator Mezzanine with Roof:** Run process operations outdoors; reduce operator and materials exposure to weather elements. Covered operator-equipment interaction points and material handling areas maintain proper material characteristics for processing.



**Adaptive E3™ Bag Spout Interface:** Ensure dust-tight transfer of material from short-spouted bags to downstream processes and accelerate discharge. Fully enclosed bag spout prevents dusting and material loss during material discharge.



**Agitator Hopper:** Provide reliable, consistent material supply to interconnected conveyor or transfer systems. Regardless of challenging material flow characteristics, the application-specific agitator design prevents bridging and ratholing of discharged product.



**Inert Atmosphere Process Interconnect:** Ensure dry product remains isolated from vapors generated from downstream tanks. Purging with dry nitrogen, or other inert gases, and venting between the dry solids discharge and process tanks, protects dry material from humidity.



# Clean Design. Clean-in-Place. Semi-free Flowing Material.

- Reduce Inspection Times, Increase Availability
- Gain Confidence When Cleaning Interior Surfaces
- Ensure Complete Material Discharge from Bulk Bag
- Improve Systemwide Operator-Equipment Access

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Clean-design Engineering & Construction:** Prevent contaminant accumulation, protect product, and reduce inspection time with items such as hoist beam cap, drip pan on hoist, and maximized stainless steel construction.



**Clean-in-Place Systems & Controls:** Equipment-specific CIP system designs deliver fullstream cleaning performance for all product contact surfaces including integrated equipment. Application-specific controls and protocols optimize CIP cycle times.



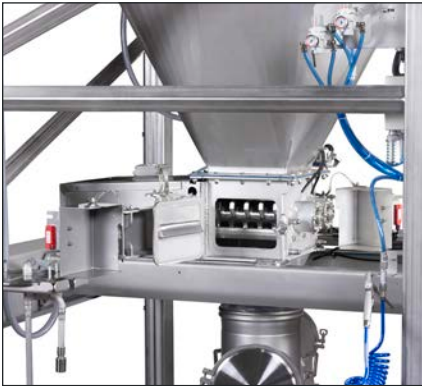
**Automatic Loop-retractor Bag Hanger:** Improve material discharge efficiency; protect product safety. Stainless steel construction prevents surface degradation. Bag loop retractors draw bag top corners up and in, forming a conical bag shape; improving material flow.



**Stainless Steel Conduit Runs:** Protect system-wide controls, sensing, and monitoring wiring from extremely harsh and corrosive environments and materials. Application-based conduit material and routing extend system availability. Galvanized, aluminum, or PVC-coated rigid conduit is available.



**Food-grade Hoist & Trolley:** Application-specific, food-grade hoist delivers confidence for sanitary environments. A white, food-grade epoxy coating, along with food-grade lubricants and stainless steel component options deliver confidence.



**Quick-clean Lump Breaker:** Ensure proper condition and size of bulk solids for efficient, consistent supply to downstream processes. Integrated screen reduces material size to 1/4-inch, or less. Screen is easily removable for cleaning access.





# Gravity Flow. Forklift-loaded. Repackaging.

- Improve Total Process Efficiency; Increase Yield
- Expand Production While Reducing Footprint
- Bring High Efficiency to Low-volume Processes
- Increase Operator-Equipment Accessibility

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Re-packaging System:** Manage internal raw material distribution. Discharge from bulk bags into other legacy container types. Eliminate reliance on third-party resources; improve material transfer throughput and handling.



**Gravity-flow Engineering & Construction:** Optimize system total cost of ownership. Engineered for top-down material flow path, framework chassis eliminates lateral conveying equipment requirements. Reduced system footprint improves contribution.



**Forklift-loading Bag Support Framework:** Improve bulk bag handling effectiveness where processes require low-volume material supply. Application-specific engineering and construction aid forklift operators in safe, secure placement into framework of bag support.



**Split Frame:** Improve bulk bag loading effectiveness in low-volume supply applications. Two-part framework and loading sequence reduce overall raised height required of forklift and enables forklift loading in low-headroom locations.



**Bag Spout Untie Box:** Provide effective access to enclosed bag spout and ties. Integrated flow control valve and application-specific downstream interconnect aid material discharge and supply. Optional view window provides safe visibility of discharge status.



**Operator Platform:** Enable safe, efficient operator access to equipment interaction points on multiple systems and on multiple levels. Designed to process-specific layout requirements and operator needs, personnel avoid unsafe over-reaching.





# Hazardous Location. Static Grounding Protection. Ingredient Batching.

- Manage Hazardous Location & Zone Requirements
- Ground & Monitor Systems for Static Electricity
- Reduce Fugitive Dust & Resulting Maintenance
- Ensure Consistent Slurry Concentration & Supply

## ENGINEERED-TO-APPLICATION PERFORMANCE FEATURES



**Loss-in-Weight Material Metering System:** Deliver reliable supply of dry solids for metering into slurry handling system. Loss-in-weight scales, engineered into framework, gauge net-weight loss during material discharge, ensuring accuracy of slurry concentration.



**Class II Division 2 Engineering & Assembly:** Enable effective protection methods to meet requirements where hazards may exist due to combustible dust. Location- and zone-specific designs use dust-tight components and grounding methods to support compliance. NBE offers a UL listed hoist for Class II Division 2 area.



**Gravity-flow Engineering & Construction:** Make efficient use of site floorspace without compromising process performance. Engineered-to-application framework chassis facilitates a top-down material flow, reducing lateral conveying and transfer requirements.



**Dust-tight, Tool-less Connectors:** Provide long-lasting, dust-tight seal for flexible connections. Tool-less installation and removal. Available in static dissipative specification.



**Material Lump Breaker:** Dual, counter-rotating agitators with variable-speed drive balance the supply of material to downstream processes. Reduce material size with stationary breaker bars integrated with the agitators for a consistent supply of flow-resistant material.



**Static Grounding Protection for Type C Bulk Bags:** Application-specific features, for Type C bulk bags, work to monitor grounding for effective electrostatic dissipation. Ground monitoring is interlocked into the fullstream process to provide a safe system.

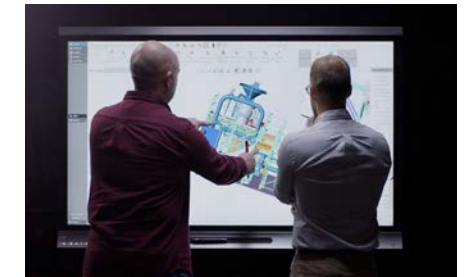


# ENGINEERED-TO-APPLICATION PROJECT DELIVERY



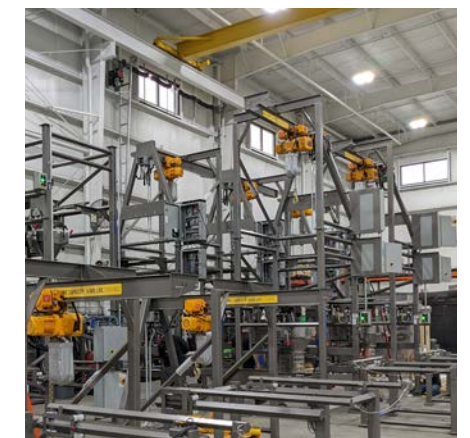
## Proactive Project Delivery Ensures Installation & Start-up Efficiency

Proper project delivery is tangible. It is proactive. The NBE dynamic project management platform delivers the transparency and instant project insights required for true collaboration. Adaptive methodologies clearly communicate evolving project priorities, avoiding unforeseen disruptions, delays, and overruns during installation and commissioning.



## Application-specific Expertise Ensures Start-up Clarity & Confidence

Bulk bag discharging equipment, systems, and projects built and delivered by National Bulk Equipment go through a thorough and rigorous quality inspection process prior to being packaged. Everything is functionally tested, including temporarily wiring field connections to control panels to accurately replicate installed operations. Every input and output device is tested, and the controls logic is validated. Upon completion, a final mechanical inspection is conducted to ensure the fit and finish meets the strict guidelines established in the NBE engineered-to-application project delivery protocols.



## Performance-proven Experience Delivers Installation & Start-up Advantages

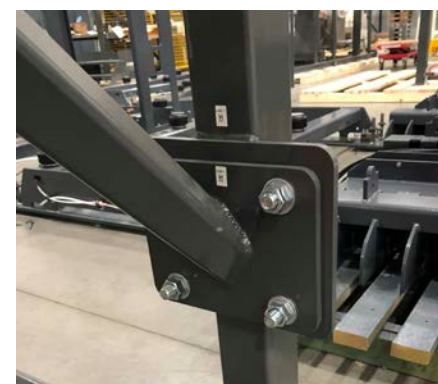
Based on the established NBE project delivery methods, the preparation and packaging of NBE bulk bag dischargers is a crucial advantage to ensuring efficient on-site handling, installation, and start-up. NBE recognizes the necessity of optimizing bulk bag discharger packaging to effectively manage installation labor and resources. Motors, instruments, and devices are all wired to control enclosures on the machines. The bulk bag discharge hoist and trolley are shipped mechanically and electrically installed on the bulk bag support framework, complete with an electrical festoon kit for trouble-free operation. When shipping methods or site conditions require major assemblies to be separated, wiring and airlines are coiled, tagged, and wrapped to expedite the on-site reassembly process. For large project installation efficiencies, mechanical subassemblies are matchmarked to simplify rigging and assembly. These are just some of the tactics that contribute to reducing on-site installation labor, supervision, and equipment time and costs. NBE engineered-to-application project delivery accountability and performance avoids the frustration, lost time, hidden costs, and blame typical of build-to-order bulk bag unloader kits.



A single 480V drop is the only site requirement needed to power-up the equipment. Pneumatic air lines are also routed from a single-point plant connection to valves and actuators.



The bulk bag discharge hoist and trolley are shipped mechanically and electrically installed on the bulk bag support framework, complete with an electrical festoon kit for trouble-free operation.



For large project installation efficiencies, mechanical subassemblies are matchmarked to simplify rigging and assembly.





FORWARD THINKING | **REAL RESULTS**

DISCHARGE	STORE	CONVEY	FILL	MIX	RECLAIM	INFEED	PROCESS	PACKAGE
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