

Automated Dry Bulk Material Handling Systems

Dry Bulk Material Handling Equipment & System Profiles



**NATIONAL BULK
EQUIPMENT®**
AN NBE COMPANY

Forward Thinking.

Material Introduction, Processing & Packaging: Accurate, Dependable, Automated

Every NBE dry bulk material handling system installation begins with Forward Thinking: looking upstream and downstream, evaluating every process influence and its possible effect on the application; from the equipment, to the material, to the operator, and the surrounding facility.

With over 15,000 installations worldwide, NBE bulk material processing systems have proven their ability to maximize process capacity and improve total line performance. The full line of NBE material handling equipment and automated processing systems includes: bulk bag dischargers, bulk bag fillers, container dischargers, container fillers, product recovery systems, conveyance systems, storage, mixing and blending, weigh systems, and automation control design and manufacturing. Look ahead to NBE. Look to Forward Thinking.



From automated bulk material processing projects to single bulk material handling units, NBE Forward Thinking will ensure trouble-free system start-up and reliable, on-going performance.

Integrated Automation: Total Process Control

Plant safety, product safety, changeovers, compliance issues, customer requirements, process complexities, equipment effectiveness; each of these factors make automated process operations a necessity. NBE integrated automation brings system-wide process control, communication, sensing, monitoring, and reporting together into a single, menu-driven, touch-screen HMI. High-speed Ethernet communications deliver information between NBE equipment and legacy systems to UL listed panels designed and built by NBE. NBE integrated automation pushes control functionality farther out, and deeper into equipment operations to optimize total line throughput and deliver a standard, system-wide, data report from the control layer. Broader controls functionality and increased data reporting improve resource management, reduce operating burden, and extend equipment lifecycles.

NBE Process Cycle Time Optimization

NBE Process Cycles: 16 completed cycles/shift



Legacy System Process Cycles: 12 completed cycles/shift



0 2 4 6 8
hours per shift

NBE automated bulk bag discharging systems are proven to reduce individual bag conditioning cycle times by 25% when compared to free-standing bag conditioners. Factored over an 8-hour shift, NBE automated bag dischargers can increase total bulk bag load-to-unload cycles by over 30%.

NBE Operator Efficiency Optimization

NBE Operator Involvement: 6 minutes/process cycle



Legacy System Operator Involvement: 9 minutes/process cycle



0 2 4 6 8
hours per shift

NBE automated bulk container filling systems are proven to increase line performance and reduce operating costs by improving labor efficiency and safety. NBE automation of manual process operations in legacy systems eliminates potentially dangerous operator interaction with equipment and reduces total operator involvement, per fill cycle, by over 30%.

Work Center Safety: Protecting People, Product & Productivity

There are common priorities in workplace safety, but not common boundaries. NBE work center safety goes beyond the common, beyond the ordinary, to ensure NBE bulk material handling systems protect the people, product, and productivity of our customers. Rigorous NBE risk assessment procedures work to prevent operator hazards while improving physical ergonomics. NBE expertise in domestic and international regulatory matters protects personnel, and raw material, from potentially harmful contaminants. And, being certified by multiple governmental and third party standards organizations, NBE design and manufacturing processes provide the assurance of performance-proven construction, streamlined start-up, and advanced productivity.

Real Results.

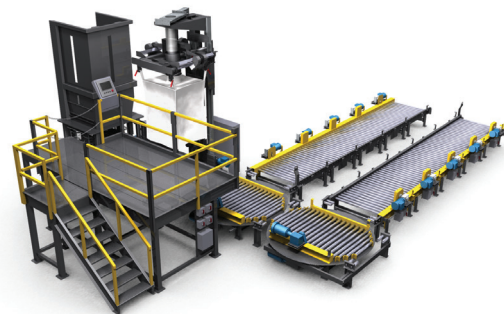
Profiles in Dry Bulk Material Handling: Process Automation & Integration

Whether integrating a single NBE bulk material handling unit into an existing line, or designing, building, and installing a complete, fully automated, processing or packaging operation, NBE will work to ensure Real Results. Real Results is the confidence that your operation is at optimal uptime availability. It's the assurance that line speeds always match application performance requirements. It's the knowledge that finished product quality will continually meet the standards of your customers. Real Results. With NBE it's proven performance.



Equipment Profiles

- Bulk Bag Discharging
- Bulk Bag Filling
- Container Discharging
- Container Filling
- Batch Weighing
- Conveying
- Mixing and Storage
- Product Recovery



Application Profiles

- Powder Processing
- Food Processing
- Chemical Processing
- General Industrial Manufacturing
- Plastics Processing
- Recycling and Reclamation
- Pharmaceuticals
- Mining

NBE provides an interactive look into the design, specification, integration, and automation of an extensive collection of NBE bulk material handling equipment and integrated systems. These NBE profiles include bulk bag dischargers and fillers, container dischargers and fillers, as well as product recovery, batch weighing, conveying, mixing, and storing equipment. Applications include powder processing, food processing, plastics and chemical processing, as well as general industrial manufacturing. View videos of NBE installations, see the efficiency advantages of NBE integrated automation. It's the outcome of Forward Thinking. It's Real Results.

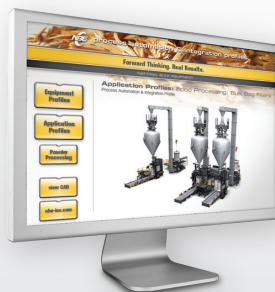
Interactive Profiles of NBE Bulk Material Handling Automation & Integration

Available for viewing at: nbe-inc.com



Process Automation

NBE process automation pushes control functionality farther out, and deeper into equipment operations to optimize total line throughput, improve plant safety, and standardize control layer reporting.



Process Integration

From self-contained, fully integrated bulk material handling systems to a single NBE unit integrated with legacy processing equipment and automation. From equipment construction to custom PLC and HMI programming, NBE integration optimizes total line performance.

Material Discharging

Consistent Material Introduction, Optimal Downstream Performance



NBE bulk material discharging systems supply downstream processes with accurate, repeatable, and consistent material supply. NBE process automation, integrated material conditioning and conveying components work together at the point of material introduction to ensure material delivered to downstream processes is accurately batched, properly conditioned, and reliably supplied.

NBE Process-Integrated Dry Bulk Material Discharging Systems

From bulk bag dischargers and container dischargers to bag dump stations and container tilt tables, NBE bulk material discharging systems provide a total material process flow advantage; increasing material introduction efficiency, ensuring accurate downstream material supply and improving labor efficiency and safety.

To view videos and download product specifications on the full line of NBE bulk material discharging systems, visit: nbe-inc.com

Bulk Bag Dischargers



Drum & Container Dischargers



Bag Dump Stations



Container Tilt Tables



Integrated Automation: Material Discharging

•Control Multiple Process Functions from One HMI

Controls placed deeper into equipment operations and centralized to a single, menu-driven HMI increase total process efficiency and improve labor allocation and safety.

•UL Listed Panels Designed and Built by NBE

From construction to programming, NBE is a single-source provider of process-specific PLCs and HMIs; including legacy systems integration.

•Process Flow Diagrams, P&IDs and Factory Acceptance Testing

3-D modeling, process flow planning, and factory acceptance testing ensure fast, trouble-free start-up and optimal line performance.

•System-wide Control Layer Data Reporting

NBE automated controls generate standardized control layer reporting, enabling ongoing assessment and optimization of equipment and materials.

•Accurate, Automated Material Discharging

Any rate, any material, in batch or continuous mode; discharge directly from the container with centralized control; improve efficiency, reduce material waste.

"The material we process is extremely sticky and compressed in the bulk bags. We used to manually break it up. Now, the machine does all the work."

Jeff P., Global Transportation Industry

Performance-proven Design & Construction

•20,000 lb. Lift Carriage Capacity, 4,000 lb. Bag Weight Capacity

Exceptional load capacity keeps pace with high-volume processing and packaging operations, exceeding ASME standard performance.

•6" x 4" x 5/16" Structural Tubing, Heavy Gauge Sheet and Plate

Built for extended duty cycles and harsh process environments; heavy-duty carbon and stainless steel construction optimizes performance.

•Operator-friendly Equipment Design and Interfacing

Physical ergonomic design enables ideal operator posture. Material dusting is controlled with sealed and enclosed discharge systems.

•Vertically Integrated Manufacturing: One Source, No Excuses

Integrated engineering and manufacturing, ISO 9001:2008-certified production procedures. Single-source accountability.

Material Filling

Precision Filling: Reliable, Repeatable, Accurate

FILL

Integrated Automation: Material Filling

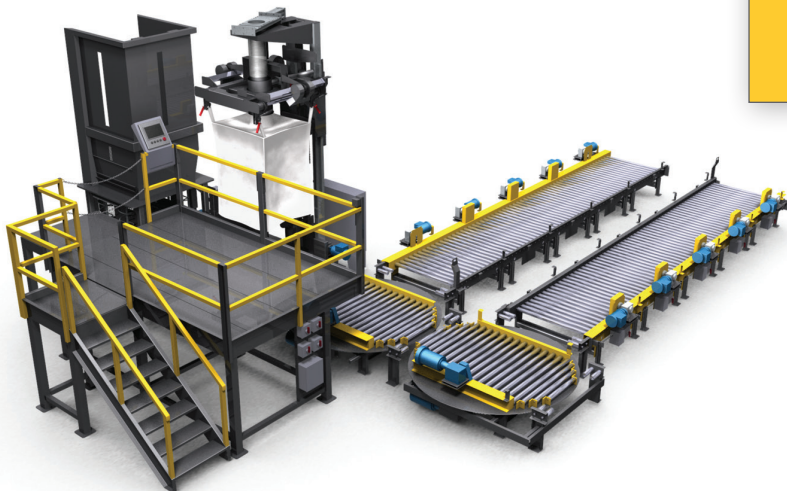
- **Automated Filling with Weigh Accuracy to +/- 1%**
NBE weigh scale devices, engineered and integrated into NBE automated filling systems, ensure consistent, repeatable weighing.
- **Process-specific PLCs and HMIs Designed and Built by NBE**
A single-source provider of automation controls and programming, NBE integrated automation increases system start-up efficiency, improves equipment communication, and increases operator safety.
- **Standardized Controls Programming; Total Process Optimization**
NBE integrated automation expands controls functionality to include legacy systems. Standardized programming across multiple platforms improves total process optimization.
- **A Single, Menu-driven HMI Centralizes System-wide Operations**
Process operations, diagnostics, and equipment calibration are controlled by a single operator; increasing labor efficiency, reducing waste and downtime.

“NBE has reduced our bag cycle time from 20 minutes to 8. They understand our specific automation needs and always cover every detail. I wish everyone worked that way.”

Gene R., Pharmaceutical Industry

Performance-proven Design & Construction

- **4,500 lb. Hang Weight Capacity, 18,000 lb. Deck Capacity**
NBE bulk bag fillers easily lift bag weights swing-style designs cannot. Platform capacity of 1,125 lbs./sq. ft. supports high-volume processing.
- **Physical Ergonomic Design Promotes Safety and Efficiency**
Pneumatically driven movements automatically position fill head for safe and ergonomic operator interaction. Reaching and stepping into equipment is eliminated and fill cycle times are reduced.
- **Equipment Construction: Power for Performance**
8 GPM hydraulic height adjustment and the industry's largest standard hydraulic and pneumatic cylinder bore sizes shorten fill cycle times compared to ball screw designs.
- **UL Listed Panels Designed and Built by NBE**
NBE is a single-source builder of process-specific PLCs and HMIs available in UL 508A, Class I and II, Division 1 and 2, Groups A-D, F and G, and NEMA 12 enclosures with Type X purge.



NBE bulk material filling systems enable packaging and processing operations to run production at designed speeds without concern for constant material waste, re-work, and excess labor costs common with under-performing equipment. NBE bulk material filling systems, with integrated weigh scale systems, go beyond basic load cell accuracy to provide repeatable, highly accurate filling and weighing. By eliminating the occurrence of over- or under-filled containers, NBE material filling systems are proven to reduce material loss, achieve optimal line speed, and improve labor safety and efficiency.

NBE Process-Integrated Dry Bulk Material Filling Systems

NBE bulk bag filling systems and bulk container filling systems provide processing operations, from general industrial manufacturing to cGMP-level packaging, the assurance of consistent operating characteristics and repeatable, exacting accuracy.

To view videos and download product specifications on the full line of NBE bulk material filling systems, visit: nbe-inc.com

Bulk Bag Fillers



Drum & Container Fillers



Material Storage

Managing Material Assets, Promoting Process Performance



NBE bulk material storage systems enable material processing and packaging operations to profitably manage the procurement, supply, and line introduction of bulk materials. From NBE large capacity exterior silos to inline agitator hoppers, NBE material storage units protect bulk dry goods from contamination and harmful environments, and keep plant operations organized and clean. NBE silos, hoppers, and bins are designed to store and accurately dispense even the most non free-flowing material with precise control and minimal operator involvement.

NBE Process-Integrated Dry Bulk Material Storage Systems

NBE bulk material storage systems are designed as process-critical components rather than commodities. Based on application-specific criteria, NBE bulk material storage and management systems deliver contaminant-free, properly conditioned, accurately dispensed material to downstream operations.

To view videos and download product specifications on the full line of NBE bulk material storage systems, visit: nbe-inc.com

Mobile Storage Hoppers



In-plant Surge Bins



Agitator Hoppers



Storage Silos



Integrated Automation: Material Storage

- **Control System-wide Storage and Supply from One HMI**
System monitoring and downstream material supply are automated through a central HMI; improving accuracy, increasing labor efficiency.
- **Process-integrated Bulk Material Management**
Critical to process efficiency, NBE integrated automation ensures accurate material feed from temporary or high-volume storage systems.
- **Automated, Multi-point Material Transfer**
High-volume, automated material transfer from bulk storage to multiple in-use locations optimizes resources and improves facility organization.
- **3-D Modeling, Process Flow Diagrams and P&IDs**
Large capacity silos or in-line agitator hoppers; NBE automated systems protect material resources and dispense them with accurate control.

“From the very start NBE understood our design criteria; whether operator ergonomics, custom surface coatings, or tight space restrictions, NBE responded.”

Jamie S., Consumer Goods Industry

Performance-proven Design & Construction

- **255,000 lb. Capacity to 700 lb. Capacity**
NBE inline bulk material supply and offline bulk material storage systems are available in application-specific designs and capacities.
- **From Concept and Construction to Completion**
NBE design, manufacturing and installation expertise speeds system start-up and ensures accurate, reliable, downstream material supply.
- **Protecting Material Integrity, Improving Process Performance**
NBE hoppers, bins, and silos eliminate material ratholing and bridging regardless of material characteristics. Structural designs maximize feed angle and capacity.
- **Exceptional Quality, Strict Standards, Immediate Productivity**
MRP-linked laser tables, high-speed machining centers, and in-house, UL listed panel building enable NBE to manufacture to exacting fit and finish within tight timelines.

Material Conveying

Ensuring Material Supply, Delivering Material Efficiency

MOVE

Integrated Automation: Material Conveying

- **Single-operator Control & Monitoring of Material and Containers**
System-wide control, communication, and monitoring of material conveyance and container routing is directed from a single, menu-driven HMI.
- **Automated, Efficient Material Transport and Transfer**
Move multiple material sources to multiple material destinations. NBE integrated automation expertise provides complete controls engineering, including legacy systems.
- **Process-specific PLCs and HMIs Designed and Built by NBE**
A single-source provider of automation controls and programming, NBE integrated automation increases system start-up efficiency, improves equipment communication, and enhances operator safety.
- **Process Flow Diagrams, P&IDs and Factory Acceptance Testing**
3-D modeling, process flow planning, and factory acceptance testing ensure fast, trouble-free start-up and optimal line performance.

“NBE Automation optimizes our operators. It makes them more efficient and helps us focus on doing what we do best.”

Dave D., Chemical & Plastics Industry

Performance-proven Design & Construction

- **Accurate, Repeatable Downstream Supply**
NBE material conveying systems ensure accurate and reliable transfer of dry bulk material regardless of material characteristics or transfer volume.
- **Process-to-Process or Process-to-Package**
NBE material conveying systems include flexible, and solid core screw conveyors; live roller conveyors, belt conveyors, material feeders, and agitator hoppers.
- **Equipment Construction: Performance without Compromise**
Heavy gauge carbon steel or Type 304 stainless, galvanized, or custom surface finishes; NBE fabrication materials and methods promote contaminant-free, consistent material conveyance.
- **UL Listed Panels Designed and Built by NBE**
NBE is a single-source builder of process-specific PLCs and HMIs available in UL 508A, Class I and II, Division 1 and 2, Groups A-D, F and G, and NEMA 12 enclosures with Type X purge.



NBE dry bulk material conveying systems are key to the effective transfer and protection of bulk material during process operations. Whether transporting material from bulk storage to production operations, conveying material from process to process, or from processing to packaging, NBE material conveying systems ensure contaminant-free, properly conditioned material is efficiently moved through production regardless of material characteristics, volume, or flow requirements.

NBE Process-Integrated Dry Bulk Material Conveying Systems

NBE bulk material conveying systems are critical to the accurate, repeatable supply of material to downstream processing or packaging operations. Conveying functions such as drive controlling, material feed sensing, material routing, and control layer monitoring are inherent to NBE integrated automation.

To view videos and download product specifications on the full line of NBE material conveying systems, visit: nbe-inc.com

Solid Core Screw Conveyors



Flexible Screw Conveyors



Material Agitator Hoppers



Belt and Roller Conveyors



Material Mixing

Proper Material Preparation, Total Process Optimization



Immediately upon start-up, NBE dry bulk material mixing and blending systems contribute to total process optimization. Ensuring thorough blends, protecting material integrity, reducing cycle times, and minimizing operator interaction; NBE mixing and blending systems bring productivity to bulk material processing and packaging operations. NBE offers a full line of mixing and blending systems including high-volume, fully automated, continuous-duty systems and precision batch mixers.

NBE Process-Integrated Dry Bulk Material Mixing Systems

NBE process integration expertise integrates bulk material mixing and blending operations into the system-wide controls architecture. Automated material introduction and discharge eliminate waste, controlled mix/blend parameters ensure accurate and thorough material recipes.

To view videos and download product specifications on the full line of NBE bulk material mixing and blending systems, visit: nbe-inc.com

Quik Mixers



Jumbo Quik Mixers



Jumbo Whirlwind Mixers



Integrated Automation: Material Mixing

- **System-wide Controls Architecture Driven by a Single HMI**
Process operations, diagnostics, and equipment calibration are all controlled by a single operator; increasing labor efficiency, reducing material waste and process downtime.
- **Automated, Accurate and Thorough Material Mixing & Blending**
NBE integrated automation improves bulk material mixing and blending efficiency; ensuring accurately blended, high-volume, homogeneous recipes.
- **A Single-source Provider of UL Listed Panels and HMIs**
Complete controls engineering, including design and construction of UL listed panels and HMIs, speeds system start-up, improves controls communication.
- **Process Flow Diagrams, P&IDs and Factory Acceptance Testing**
3-D modeling, process flow planning, and factory acceptance testing ensure fast, trouble-free start-up and optimal line performance.

“The quality of the mix directly effects the quality of our product. The NBE system has virtually eliminated scrap. We have proof, we track scrap in our system database.”

Terry B., Non-woven Material Industry

Performance-proven Design & Construction

- **100,000 lb. Capacity to 100 lb. Batch Capacity**
Large or small, the value of proper blends completed in optimal cycle times is equally important. NBE material mixing and blending systems enable reliable material preparation with minimal operator involvement.
- **Consistent Blend Quality, Confident Downstream Supply**
NBE mixing and blending systems include features such as broad-top dispersion paddles and in-feed scoop blades to ensure properly prepared material is supplied to downstream processing or packaging operations.
- **Built for Extended Duty Cycles and Harsh Environments**
Heavy gauge carbon steel, Type 304 stainless, or custom surface finishes; custom ribbon and auger designs ensure homogeneous blends regardless of material characteristics.
- **Vertically Integrated Manufacturing: One Source, No Excuses**
Fully integrated engineering and manufacturing, supported by MRP operations infrastructure and ISO 9001:2008-certified production procedures. Single-source accountability.

Material Weighing

Accurate: No Waste, No Re-work, No Doubts

WEIGH

Integrated Automation: Material Weighing

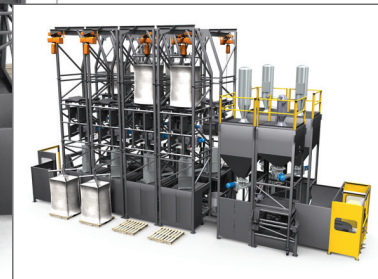
- **A Single, Menu-driven HMI Centralizes System-wide Operations**
Control, communication, monitoring, and reporting of process operations are directed from a single, menu-driven HMI, increasing labor efficiency and reducing downtime.
- **Automated, Reliable Weighing: Accurate to +/- 1%**
NBE weigh systems provide automated assurance that filled weights are repeatedly accurate, material volume is precise, and material waste is eliminated.
- **Process-specific PLCs and HMIs designed and Built by NBE**
A single-source provider of automation controls and programming, NBE integrated automation increases system start-up efficiency improves equipment communication, and enhances operator safety.
- **Standardized Controls Programming: Process Optimization**
NBE integrated automation expands controls functionality. Standardized programming improves total process optimization.

"Our batch ingredient weights are critical; we used to weigh them by hand. The accuracy of NBE automated equipment took a very labor intensive step and automated it to where all we do now is monitor the system."

John D., Building Components Industry

Performance-proven Design & Construction

- **Precision Fabrication Ensures Consistent Scale Accuracy**
Design-stage integration of NBE weigh systems ensures reliable, repeatable accuracy; unmatched by common, bolt-on, third-party scale components.
- **6" x 4" x 5/16" Structural Tubing; Heavy Gauge Sheet and Plate**
Built for extended duty cycles and harsh process environments; heavy-duty carbon and stainless steel construction optimize performance.
- **Exceptional Quality, Strict Standards, Immediate Productivity**
MRP-linked laser tables, high-speed machining centers, and in-house UL listed panel building enable NBE to manufacture to exacting fit and finish within tight timelines.



Bulk material processing and packaging operations are being pressured by tighter customer specifications, increasing material costs, safety directives, and stringent supply chain limitations. NBE weigh systems provide reliable, repeatable, precision-weighed bulk containers, properly supplied process lines, and accurately weighed finished packages. NBE enables even greater process efficiency by linking these weigh scales into system-wide communications, sensing, monitoring, and reporting. Automated material weighing increases process accuracy, optimizes total line throughput and improves resource management.

NBE Process-Integrated Dry Bulk Material Weigh Systems

From material introduction to final packaging, in continuous or batch mode, NBE weigh systems leverage the advantages of NBE integrated automation to provide incremental material management accuracy and reduction in material waste, package re-work, labor, and inventory.

To view videos and download product specifications on the full line of NBE bulk material weigh systems, visit: nbe-inc.com

Gain-in-Weight



Loss-in-Weight



Weigh Hoppers



Weigh Conveyors



Precision Production

Ensuring System Start-up Confidence with ISO-certified Production and UL Listed Controls Design and Construction

Every dry bulk material handling unit and automated material processing system produced by NBE represents decades of engineering expertise and is the outcome of a technologically advanced manufacturing operation. MRP systems enable accurate and immediate information transfer between NBE 3-D modeling, engineering, and manufacturing departments. And, NBE ISO 9001:2008-certified production procedures ensure productive factory acceptance testing, streamlined start-up, and immediate line performance optimization.

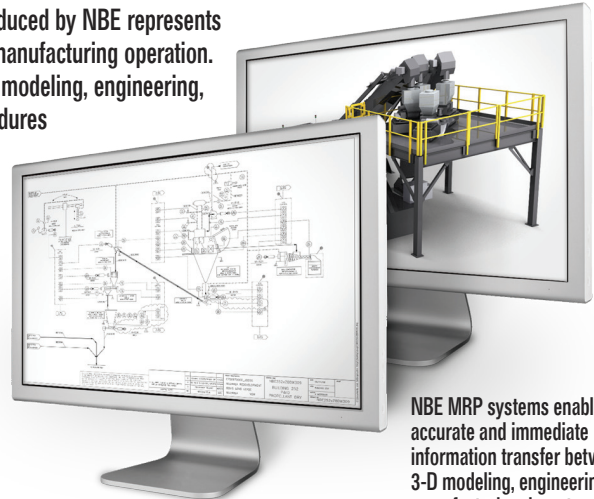
Process Flow Planning & Production

- P&ID Documentation
- Pre-production Equipment Rendering
- 3-D In-plant Layout Views
- Automation & Data Acquisition Planning
- Risk Assessment

The performance-proven construction of NBE equipment is fully leveraged when integrated with UL listed controls and automation designed and built by NBE. NBE custom panel configurations include UL 508A, Class I and II, Division 1 and 2, Groups A-D, F and G, and NEMA 12 enclosures with Type X purge. For optimal performance, automated operations, including those of legacy systems, are centralized to a single, menu-driven HMI.



All NBE controls are custom-built in a dedicated, on-site UL certified panel build facility. NBE panel configurations include UL 508A, Class I and II, Division 1 and 2, Groups A-D, F and G, and NEMA 12 enclosures with Type X purge.



NBE P&ID documentation and system start-up expertise ensure immediate process optimization.

NBE MRP systems enable accurate and immediate information transfer between 3-D modeling, engineering, and manufacturing departments.



NBE ISO 9001:2008-certified production procedures ensure every component and every final-assembled system is manufactured to exacting tolerances and inspected and tested before delivery.

Exceptional Performance

Single-source Design, Engineering and Manufacturing

Total accountability: from concept to completion. No best-guess design plans. No outsourced fabrication. No contract installers. No third-party service support. NBE material handling equipment and process systems are designed, engineered, and produced in-house, by NBE. This vertically integrated engineering and production environment enables NBE to manufacture equipment and systems to exceptional quality standards, within strict production schedules.

Equipment Design & Construction

- Automated Laser Tables
- In-house R&D and Test Lab
- 3-D Modeling Design Software
- High-speed Machining Centers
- UL listed Panel Construction

NBE operations cover over 100,000 square feet, including R&D and testing facilities where fully operational, fully integrated bulk discharging, filling, mixing, conveying, reclaim, and automation systems are run to replicate actual in-use customer applications and environments. NBE operations also include a stand-alone, enclosed environment exclusively for the design and construction of UL listed controls for NBE equipment and systems.



Integrated, in-house manufacturing systems include MRP-linked laser tables to ensure highly accurate sheet and plate cutting for tight fit and quality finish.



NBE operations cover over 100,000 square feet and include manufacturing, R&D, and UL listed controls construction.



NBE R&D and testing facilities run fully operational, fully integrated, and fully automated systems to replicate in-use customer applications and environments.



Multiple, large-scale factory acceptance testing areas enable complete, pre-installation set-up, operation, and customer evaluation of equipment and automation prior to shipment, installation, and start-up.





**Bulk Bag
Fillers**



**Bulk Bag
Dischargers**



**Drum & Container
Fillers**



**Drum & Container
Dischargers**



**Agitator
Hoppers**



**Bag Dump
Stations**



**Bulk Material
Mixers**



**Storage Bins,
Hoppers & Silos**



**Bulk Material
Handling**



**Product Recovery
Systems**



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