



APEEC

Automated Process Equipment Corporation

The Engineer's Guide to Selecting Dry Ingredient Processing Equipment



Introduction

From batch mixing to coating and conveying, every step in dry ingredient processing depends on equipment that performs reliably and consistently. For plant managers and engineers, even minor inefficiencies can ripple through the entire operation, reducing throughput, increasing waste, and jeopardizing product quality. Choosing the right dry ingredient processing equipment isn't just about finding machines that fit your space or budget; it's about designing a system that supports efficiency, sanitation, and long-term growth.

This guide is designed to help production professionals evaluate their options, understand how different types of equipment work, and identify what to look for in each category. Whether you're planning a new facility, expanding your production line, or upgrading outdated machinery, you'll find practical insights into how design, materials, and integration decisions affect performance and return on investment.

Chapter 1: Key Considerations When Selecting Dry Ingredient Processing Equipment

Selecting your processing equipment involves more than comparing specifications. Every decision, from mixer size to conveyor speed, impacts the consistency, safety, and profitability of your operation. The best systems are those that fit your ingredients, your process, and your facility perfectly.

Understanding Your Process Requirements

Before selecting equipment, define your product goals, batch sizes, and ingredient characteristics. These details determine the type of equipment, mixing method, and discharge design you'll need. Factors such as ingredient density, flowability, and friability will guide whether you need gentle mixing, precise weighing, or specialized discharge controls.

Designing for Hygiene and Sanitation

Cleanability should be built into every piece of equipment. Look for stainless steel construction, sanitary welds, and smooth surfaces that resist buildup. Equipment designed with easy access points and tool-free disassembly will simplify cleaning and reduce the risk of contamination. These design details not only protect product quality but also minimize downtime between batches.

System Integration: How Each Component Works Together



BATCHING AND WEIGHING



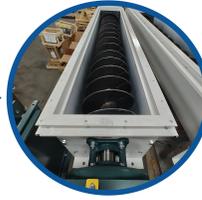
MIXING



**PELLET MILLS/
EXTRUDERS**



COOLING/DRYING



**CONVEYING AND
COATING**



**PACKAGING/
LOAD-OUT**

A dry ingredient processing line performs best when every system is designed to work together in a coordinated process. Take, for example, the processing of dry-formulated products such as animal feed, pet food, cereals, or puffed snacks:

1. Batching and weighing systems measure and dispense each ingredient with the required accuracy.
2. Mixers blend the ingredients into a uniform formulation.
3. Pellet mills or extruders form the blended mix into its final shape, forcing it through a die and cutting it to size. In this step, heat and steam are often applied to achieve the proper texture and structure.
4. Coolers or dryers reduce moisture and stabilize the shaped product.
5. Conveying systems move material efficiently to coating equipment, where oils, fats, or flavorings are applied evenly.
6. The finished product is then conveyed to packaging or load-out, depending on the application.

At the front end, bulk material handling equipment ensures consistent ingredient flow into the process. Throughout the line, automation and controls connect each component, synchronizing timing, flow rates, and data tracking.

When every system communicates and aligns physically with the next, production becomes smoother, safer, and easier to scale.

Customization and Scalability

No two facilities are the same. Choose equipment that can be tailored to your process, ingredient types, and available space. Modular, configurable systems make it easier to expand or adapt as production demands change. Whether it's adjusting batch size, integrating new ingredients, or increasing throughput, scalability ensures your investment continues to deliver long-term value.

Maintenance and Downtime

Reliable equipment reduces unplanned shutdowns and maintenance costs. Look for systems with accessible components, simple drive mechanisms, and minimal wear parts. Prioritizing ease of maintenance up front saves hours of labor and prevents bottlenecks later.

Evaluating Total Cost of Ownership

The purchase price tells only part of the story. Energy use, maintenance frequency, spare parts availability, and service life all influence the total cost of ownership. Choosing equipment that runs efficiently and lasts longer will deliver greater value over time, even if the initial investment is higher.

Choosing the Right Supplier

Your equipment manufacturer should be a long-term partner, not just a vendor. Work with a company that provides in-house engineering, fabrication, and testing, and can support your systems after installation. Reliable technical support and customization expertise can make the difference between a system that simply runs and one that truly performs.

Setting the Foundation for Success

When these considerations are factored in early, engineers and plant managers can design systems that maximize throughput, maintain consistent product quality, and meet sanitation and safety standards. The chapters that follow explore the core systems involved with dry ingredient processing: bulk material handling, batching and weighing, mixing, coating, conveying, and automation. Read on to learn about each of these systems and how to choose systems that improve efficiency, consistency, and long-term performance.

Chapter 2:

Bulk Material Handling Systems

Bulk material handling systems manage the movement, storage, and discharge of dry ingredients at the start of the production process.

When designed correctly, these systems protect product integrity, maintain consistent flow, and keep operations safe and efficient. When they're overlooked, plants can face downtime, contamination risks, or uneven ingredient flow that disrupts batching and mixing.



What to Look for in a Bulk Material Handling System

1. **Effective Material Flow Control:** Choose equipment that prevents bridging, rat-holing, and inconsistent discharge, especially for powders that tend to compact or clump.
2. **Dust Containment:** Look for sealed systems with integrated venting or filtration to reduce airborne particles and improve plant safety.
3. **Discharge Efficiency:** Match your discharger type (such as bulk bag unloader or hopper) to the material's flow characteristics and downstream equipment.
4. **Operator Safety:** Include hoists, bag lifters, and dust-tight connections to minimize manual handling and exposure.

Why APEC's Bulk Material Handling Systems Stand Out

- **Bulk Bag Unloaders:** Designed with vibration, agitation, and dust control options to handle difficult-flow materials without clogging or bridging.
- **Hoppers and Bins:** Built to maintain consistent flow and prevent material buildup with smooth, sanitary construction and flow-aid options.
- **Integrated Controls:** Connect directly with batching and weighing systems for precise ingredient handling and process automation.
- **Durable, Easy-to-Maintain Design:** Heavy-duty frames and easy-access components extend lifespan and reduce downtime.

APEC's bulk material handling systems provide safe, reliable ingredient flow and seamless integration with the rest of your process, keeping your operation efficient from the very first step.

Chapter 3: Batching and Weighing Systems

Batching and weighing systems are at the heart of any consistent dry ingredient processing operation. They ensure that every formulation is measured accurately, every ingredient is added in the correct amount, and every batch meets the same high standards. Errors in weighing or batching can lead to wasted ingredients, inconsistent product quality, and costly rework.



What to Look for in a Batching and Weighing System

1. **Accuracy:** Choose a system with precise weighing capabilities and load cells that can handle the range of ingredient sizes in your formulations.
2. **Speed and Flow Control:** Look for variable-speed feeders or dual-speed gates to maintain throughput without sacrificing precision.
3. **Automation:** Select systems that can automate ingredient sequencing and data collection for traceability and efficiency.
4. **Flexibility:** Make sure the design can accommodate a range of ingredient types, from fine powders to micro ingredients, and scale with future production needs.

Why APEC's Batching Systems Stand Out

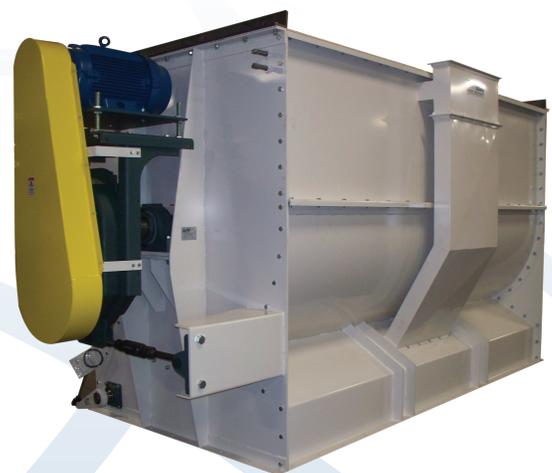
APEC offers a complete line of [batching and weighing equipment](#) designed for precision, reliability, and seamless integration. Each system is engineered in-house to ensure accurate ingredient control and consistent results from batch to batch.

- **Major and Minor Ingredient Batching Systems:** Handle bulk ingredients efficiently with reliable weighing, sequencing, and discharge control.
- **Micro Ingredient Systems:** Deliver accurate dosing for vitamins, minerals, and other small-volume ingredients critical to product quality.
- **Gain-in-Weight and Loss-in-Weight Systems:** Provide precise measurement for continuous and batch processes.
- **Durable, Food-Grade Construction:** Built from stainless steel for easy maintenance, sanitation, and long service life.

APEC's batching and weighing solutions help food and feed manufacturers achieve consistent, repeatable formulations while improving efficiency and reducing waste.

Chapter 4: Mixing Equipment

Mixing is the foundation of every dry ingredient processing operation. Industrial mixers come in many forms, including paddle, vertical, fluidized zone, and high-shear designs. Each serves a specific purpose, but for most dry food applications, the horizontal ribbon mixer delivers the best combination of speed, consistency, and gentle handling.



A ribbon mixer uses two helical ribbons, one moving material forward, the other backward, to create a fast, thorough, and uniform blend. This motion makes it ideal for powders, granules, and dry bulk ingredients where even distribution is critical.

What to Look for in a Horizontal Ribbon Mixer

1. **Size and Volume:** Match the mixer's swept volume (the active mixing area) to your batch size and throughput goals.
2. **Agitator Design:** Choose the right ribbon or ribbon-paddle combination based on your ingredients' density and sensitivity.
3. **Horsepower:** Ensure the motor is properly sized for efficient operation without strain or wasted energy.
4. **Discharge Gates:** Select between drop-bottom or pneumatic slide gates depending on your discharge rate and downstream process.
5. **Ingredient Characteristics:** Account for friability, particle size, adhesion, and other properties that affect how materials flow and mix.
6. **Facility Requirements:** Confirm that the mixer's dimensions and connections fit your layout and integrate with existing systems.

Why APEC's Horizontal Ribbon Mixer Stands Out

APEC designs and fabricates each horizontal ribbon mixer in-house for durability, performance, and easy maintenance.

- **Consistent Mixing:** A double-ribbon agitator blends ingredients end-to-end for uniform results.
- **Durable Design:** A solid center shaft and bearing supports eliminate chains and sprockets, reducing maintenance.
- **Customizable Options:** Configurable size, capacity, horsepower, discharge gates, finishes, and weighing integrations.
- **Low Maintenance:** Fewer wear parts and optional abrasion- or corrosion-resistant finishes extend service life.
- **Safe and Efficient:** Energy-efficient and explosion-proof motor options ensure reliability and compliance with food safety standards.

APEC's horizontal ribbon mixer offers a reliable, customizable solution for processors seeking higher throughput, consistent quality, and simplified maintenance.

Chapter 5:

Coating Systems

Coating systems apply liquids to dry materials to improve flavor, texture, nutrition, or product performance. In dry ingredient processing, even coverage is critical. Inconsistent coating can affect quality, shelf life, and customer satisfaction.



What to Look for in a Coating System

Uniform, consistent coverage is the most important factor in coating performance. The system should apply liquids evenly across the full material stream without buildup, clogging, or variation between batches. Precise control over droplet size, application rate, and flow ensures that every particle receives the same coating, improving quality, reducing waste, and enhancing shelf life.

The coating method also plays a critical role. Modern systems, such as those using spinning disc technology, provide finer control than traditional spray nozzles. This allows for more even application while eliminating clogging and reducing downtime. When evaluating systems, consider how coating control, application accuracy, and system design will affect your throughput and product consistency.

Why APEC's Mistcoater Stands Out

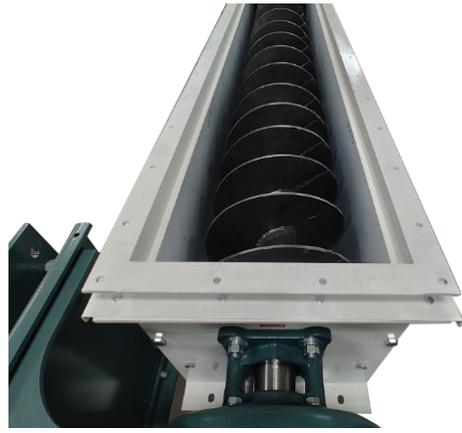
While most coating systems rely on spray nozzles that can clog or create uneven coverage, [APEC's Mistcoater SST](#) uses spinning disc technology to apply a fine, uniform mist across dry materials. This approach eliminates nozzle blockages, reduces downtime, and consistently delivers an even, gentle coating that preserves product integrity.

The Mistcoater also features a quick-clean stainless steel design and a compact build that easily fits existing footprints. In short, APEC's Mistcoater SST combines consistency, efficiency, and easy maintenance, helping food processors and [animal feed manufacturers](#) deliver a better product while minimizing cleanup and downtime.

Chapter 6:

Conveying Systems

Conveyors keep materials moving through every stage of dry ingredient processing from batching and mixing to coating and final prep. The right conveying system reduces manual handling, protects product quality, and keeps your process running efficiently.



While there are many types of conveyors, including [pneumatic conveyors](#), and drag and belt conveyors, screw conveyors are the most common and versatile for handling dry, powder, and granular materials. Learn what to look for in a screw conveyor and other types of conveyors to consider.

Screw Conveyors: The Core of Food Material Handling

A screw conveyor uses a central shaft with helical screw flights to move material through an enclosed housing. When designed correctly, it provides precise, controlled movement and consistent throughput.

Key advantages of screw conveyors include:

- Enclosed design that prevents dust and contamination
- Gentle movement that is ideal for dry ingredients
- Flexible installation for horizontal or slightly inclined layouts
- Reliable operation with minimal maintenance

What to Look for in a Screw Conveyor

1. **Pitch and Screw Type:** Choose ribbon, sectional, or shaftless configurations to suit your material's flow and density.
2. **Incline and Diameter:** Proper engineering ensures efficient movement while minimizing power consumption.
3. **Material Characteristics:** Consider abrasiveness, corrosivity, and flowability to select the right construction and finish.

Other Common Conveyor Types

While screw conveyors are APEC's primary solution, some applications call for different designs:

- **Pneumatic Conveyors:** Move powders and lightweight materials through pipelines using air pressure or vacuum. Ideal for long distances or complex routing, these systems minimize dust and product loss.
- **Drag and Belt Conveyors:** Handle fragile or friable materials gently, reducing breakage and preserving product shape.

Why APEC Conveyors Stand Out

APEC has been designing and manufacturing [screw conveyors](#) for more than 30 years, helping processors improve efficiency, reduce wear, and minimize downtime.

- Custom-engineered screw conveyor designs tailored to each application
- Heavy-duty components that extend lifespan and reduce maintenance
- Optimized pitch, diameter, and materials for efficient operation
- Integration with APEC mixing, coating, and batching systems for a complete process solution

APEC's screw conveyors form the foundation of efficient material handling, ensuring your ingredients move safely and reliably through every stage of production.

Chapter 7:

Automation and Controls

Automation and control systems connect every stage of production, from ingredient batching to coating and packaging, into one cohesive process. With the right controls, you can ensure consistent quality, reduce operator error, and collect data for better decision-making. Without them, even the best-designed equipment can fall short of its potential.



What to Look for in a Screw Conveyor

1. **Integration:** Choose a system that communicates seamlessly with your batching, mixing, coating, and conveying equipment.
2. **Scalability:** Make sure your control platform can adapt to future production increases or equipment upgrades.
3. **User Interface:** Look for intuitive operator screens that make training easier and minimize errors.
4. **Data and Traceability:** Systems that log batch data, alarms, and trends improve process control and regulatory compliance.
5. **Reliability:** Industrial-grade components and redundant safety features keep your line running smoothly.
6. **Support and Customization:** Work with a provider who can tailor the control logic, screens, and reporting to your specific process.

Why APEC's Automation and Control Systems Stand Out

APEC's automation and control systems are designed to give processors complete visibility and command of their production lines. From individual equipment controls to full plant integration, APEC engineers build systems that improve efficiency, consistency, and safety.

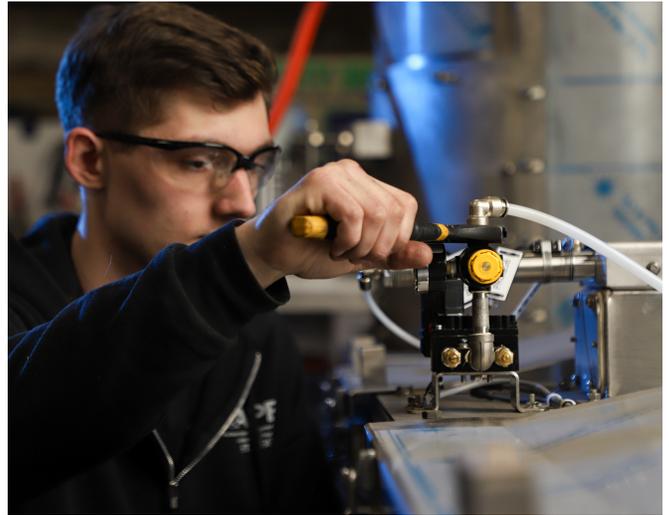
- **Custom PLC and HMI design** for full process control and intuitive operation
- **[BatchBox](#) and Batch Control Systems** that provide precise batching, sequencing, and reporting
- **Real-time data tracking** for quality assurance and production insight
- **Seamless integration** with APEC mixers, coaters, conveyors, and batching systems
- **Remote monitoring and diagnostics** to minimize downtime and simplify maintenance

APEC's automation and controls bring every system together under one platform, improving accuracy, traceability, and throughput while giving you the flexibility to grow and adapt your operation over time.

Chapter 8:

Choosing the Right Equipment Manufacturer

Automation and control systems connect every stage of production, from ingredient batching to coating and packaging, into one cohesive process. With the right controls, you can ensure consistent quality, reduce operator error, and collect data for better decision-making. Without them, even the best-designed equipment can fall short of its potential.



What to Look for in an Equipment Manufacturer

When evaluating potential equipment manufacturers, start with engineering expertise. A strong partner will offer in-house design and fabrication capabilities, ensuring your equipment is built specifically for your process rather than modified from a standard template. Look for a team that can customize every aspect of the system, from materials and layout to throughput and control integration, so it aligns with your facility and production goals.

Experience also matters. Ask for case studies or examples of similar projects to confirm that the manufacturer understands your industry's materials, safety standards, and performance requirements. A reputable supplier should provide system testing, installation support, and post-startup adjustments to validate performance before your line goes live.

Finally, choose a company that offers ongoing service, spare parts availability, and responsive technical support. The best manufacturers view every installation as the start of a long-term partnership, not a one-time sale.

Questions to Ask Dry Ingredient Processing Equipment Manufacturers

Before signing a purchase order, ask these key questions to evaluate the manufacturer's quality, transparency, and expertise:

1. **Can you build to my specifications?** Confirm the manufacturer can meet your process, material, and safety requirements, including environmental hazards, sanitation standards, and electrical ratings.
2. **What's included in the quote?** Ensure testing, delivery, and installation are clearly defined to avoid surprise costs or scope gaps.
3. **What components and suppliers do you use?** Ask about component quality, standardization, and availability for future repairs or replacements.
4. **What testing or validation is performed before shipment?** Factory testing and validation help confirm that your system performs as expected before installation.
5. **What type of support do you offer after installation?** Look for long-term service programs, remote troubleshooting, and easy access to replacement parts.
6. **Can I speak with past customers?** References or case studies provide insight into the manufacturer's reliability, communication, and real-world results.

Asking these questions helps ensure your investment will deliver dependable performance and long-term value.

Why APEC Stands Out

APEC combines engineering, fabrication, and process expertise under one roof to deliver complete, reliable dry ingredient processing systems. Each solution is designed to maximize efficiency, consistency, and safety while integrating seamlessly with existing operations.

- **Full in-house design, engineering, and manufacturing** for complete control over quality and customization
- **Decades of experience** serving the food, pet food, and animal feed industries
- **Extensive testing capabilities** to ensure equipment performs as designed before installation
- **Comprehensive service and support** through installation, training, and maintenance
- **Proven results** demonstrated through long-term partnerships and successful case studies

APEC isn't just an equipment supplier. It's an engineering partner committed to building systems that perform reliably for years to come.

The Right Equipment and the Right Partner to Optimize Your Process

Selecting dry ingredient processing equipment is a complex process that affects every part of production, from ingredient handling to finished product preparation. The right systems improve consistency, efficiency, and safety, while the wrong ones can lead to downtime, waste, and lost productivity.

By understanding each type of equipment and the factors that influence design and performance, you can make more informed decisions that strengthen your process and protect your investment.

At APEC, every system is designed, engineered, and built in-house to meet the specific needs of food, pet food, and animal feed manufacturers. Whether you're upgrading a single component or designing a complete process line, APEC's experts can help you develop a solution that integrates seamlessly, performs reliably, and scales with your operation.

Let's discuss how our custom-engineered systems can improve your process efficiency and product quality.

[Contact APEC for a Quote](#)