



THE FRED D. PFENING COMPANY  
DEDICATED TO THE BAKING  
INDUSTRY SINCE 1919

## BULK FLOUR SYSTEMS

A bulk flour system stores, sifts, conveys, and automatically weighs out exactly the amount of flour needed each time. The system is dust-free and low maintenance and will give many years of trouble-free service.

### The basic bulk flour system includes:

- ◆ Truck unloading station
- ◆ Storage silos
- ◆ Pressure or vacuum conveying
- ◆ Sifter
- ◆ Scale hoppers for weighing out batches
- ◆ Control system to operate the system
- ◆ Dust collection system

### More sophisticated systems may include:

- ◆ Railcar unloading
- ◆ Intermediate storage bins – called use bins or day bins
- ◆ Multiple conveying systems
- ◆ Separate systems for whole wheat or other specialty flours
- ◆ Computer batching systems for multiple recipes and MIS uses

### Related systems are (see separate brochures):

- ◆ Bulk sugar systems
- ◆ Minor ingredient systems
- ◆ Powdered sugar systems
- ◆ Liquid ingredient systems
- ◆ Batching control systems



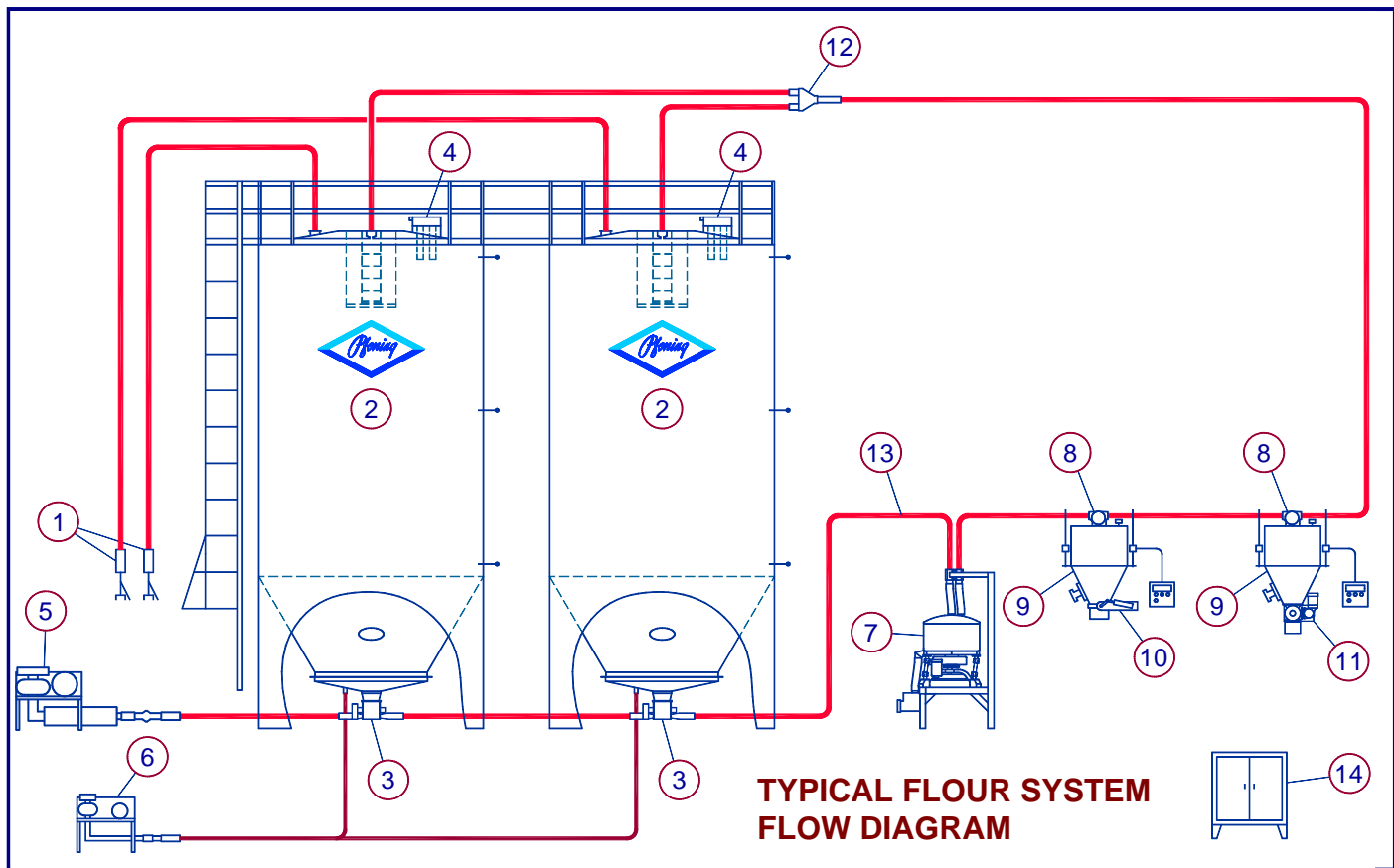
### Handling flour with a bulk system offers many advantages:

- ◆ Significant cost savings over bagged flour.
- ◆ Higher production than manual systems.
- ◆ Better batch quality, accuracy and control.
- ◆ Space and labor savings.
- ◆ Eliminates risk of injury from handling heavy bags.
- ◆ Eliminates dust, bag breakage and empty bag cleanup.

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## **TYPICAL FLOUR SYSTEM FEATURES (for more details see individual brochures):**



1. **Truck unloading station and silo fill tubes** – A lockable stainless steel cabinet with connections for bulk truck hoses to deliver flour through fill tubes to each silo. Includes silo level indication and overfill alarms.



2. **Storage silos** – Cylindrical all-welded steel, aluminum or stainless steel silos with capacity typically in the 75,000 to 150,000 pound range. Includes ladder, handrails, level sensors, conical bottom with access hatch, vibratory or airslide discharge. Outdoor silos have weather skirts with double doors. Indoor silos are open with structural legs for support. Multiple discharges and divided silos available. Seamless, all-welded construction is superior to bolted construction in strength and cleanliness. Mild steel tanks are finished with food-grade epoxy on inside and acrylic enamel outside. Silos may be mounted on load cells for continuous inventory control. Low-profile storage bins are available for restricted areas.



3. **Rotary feeders** – Precision machined, heavy-duty rotary vane blow-through type feeder for feeding flour into pressure or vacuum conveying line. Standard construction is cast iron body with steel rotor. Includes rugged low-maintenance gearmotor with chain drive and guard. Stainless steel and hard chrome construction are also available. High capacity model available.



4. **Dust collectors** – Easy-open, top-access dust collector used to vent conveying air from silo filling and air conveying. Housing is stainless steel and filters snap in from the topside, requiring no tools. Filters are washable FDA compliant cartridge type with PTFE membrane for effective filtration and dust release. Reliable, reverse pulse on-line cleaning is used during collector operation. Efficient design minimizes air consumption. Requires minimal maintenance.



5. **Conveying blower** – Pfening conveying blowers, either pressure or vacuum, utilize a rugged industrial grade positive displacement rotary blower, a premium quality energy efficient motor and a v-belt drive. The frame is a sanitary all-welded open design to minimize dust accumulation. An efficient intake filter/silencer and discharge muffler are standard, along with a check valve, relief valve, and pressure switch with gauge. Pfening has over 50 years of experience in engineering flour systems to provide more accurate blower sizing, resulting in lower initial costs and operating expenses than the oversized units frequently furnished by less experienced firms.



6. **Airslide blower** – The airslide blower provides fluidizing air for the silo airslide discharger. Specifications are similar to the conveying blower, except the airslide blower uses a pulsing valve to provide pulsed airflow to the fluidizing bed. Pulsing has been demonstrated to significantly improve airslide operation.



7. **Sifter** – An in-line sifter with sifting screens to remove oversize impurities from the flour before it is used. Typical screen size is 30 mesh (30 wires per inch) for white flour and 16 mesh for whole wheat flour. The Pfening sifter uses a gyratory action to move the flour across the screen decks. The drive is of rugged, long-lasting construction. The support stand is all welded with a support mast for the overhead conveying tubing. Screen decks are of lightweight aluminum construction. All internal parts are stainless, aluminum, or FDA approved plastic. The Pfening design may be used in either pressure or vacuum conveying systems. New design is user-friendly.



8. **Separator valves** – This flour inlet valve mounts on top of a scale hopper and separates the flour from the conveying air. It has a lightweight, corrosion-resistant aluminum body and a precision-machined bronze diverting vane. There are no rubber parts or seals in the product zone. The valve is operated by a stainless steel air cylinder and comes complete with solenoid valve, position switches, and wiring harness for easy installation. Models available for 2" to 5" conveying lines. Stainless steel and hard chrome versions are also available.



9. **Scale hoppers** – Stainless steel hoppers use electronic load cells to weigh flour from the conveying system and discharge it into a mixer. The load cells are S-type stainless steel sealed units with precision bearing type suspension for superior performance. The load cells are carefully matched to the application for unsurpassed accuracy. The scale hopper is equipped with a vacuum breaker relief valve. Discharge flow aids include vibratory and/or air fluidizers. The fluidizing bed discharge is available for harder to discharge flour products. An electronic scale controls the batch weight.



10. **Butterfly valves** – The scale hopper is equipped with a butterfly valve for quick flour discharge. This valve has a sanitary, corrosion-resistant aluminum disc and body and uses a food-grade rubber seat for a tight seal. It is operated by an air cylinder and equipped with a solenoid valve. The butterfly valve may have either a fabric discharge sleeve or a stainless steel spout. It is available in 10" and 12" diameters. It is used with gain-in-weight scaling systems. A stainless steel disc is available.



11. **Rotary airlock** – If a more controlled rate of discharge is needed, the scale hopper may be fitted with a rotary airlock. This unit has a durable cast iron body, a rugged steel rotor precision-machined for smooth operation. Bearings are outboard with inboard shaft seals for long life and easy maintenance. The airlock is driven by a rugged gearmotor and chain drive with guard. The round discharge is easily fitted with a discharge sleeve or spout. Hard chrome and stainless steel models are available. Used with loss-in-weight scaling systems. High capacity model available.



12. **Diverter valve** – The three-way diverter valve switches flow from one conveying line to another. It has a lightweight, corrosion-resistant aluminum body and a precision-machined bronze diverting vane. There are no rubber parts or seals in the product zone. The valve is operated by a stainless steel air cylinder and comes complete with solenoid valve, position switches, and wiring harness for easy installation. Models available for 2" to 5" conveying lines. Stainless steel and hard chrome models are also available.



13. **Conveying tubing** – Standard flour system piping is 3", 4", or 5" O.D. lightweight aluminum tubing. Four-bolt clamp-type, gasketed couplings with grounding strap are standard. Supports include heavy-duty clamps with hangers and bracing as appropriate for securing conveying tubing. Elbows are precision formed, smooth both inside and out. Intermediate radius elbows are used because they are more efficient than short or long radius elbows. Stainless steel tubing, elbows and sanitary connectors are available for special requirements.



14. **Control system** – The electrical control system consists of three major sub-systems: the power components, the operator interfaces, and the logic system. The power components include disconnects, circuit breakers, motor starters, and other components. The operator interfaces typically includes touchscreen graphics technology, custom-programmed to enable the operator to draw flour, control inventory, diagnose and troubleshoot problems. The logic tasks are usually performed by a PLC, but may be computer-based where complex recipe and batch management are required. These systems may be programmed to provide data to central Management Information Systems (MIS). Pfening supplies Allen-Bradley components as standard.

## FLOUR SYSTEM ACCESSORIES:



1. **Bagdump stations** – For loading smaller amounts of material from bags or containers, Pfening offers bag dump stations which can be integrated into the pneumatic conveying system. These are a fully-enclosed stainless steel dump hoppers, with a gas-spring assisted door. The dust collector may be internal or remote. A rotary feeder is mounted to the bottom of the unit.



2. **Bulk bag unloaders** – For materials used in amounts justifying bulk bags of 1000 pound capacity or more, Pfening offers unloaders which feature hoists, spout connectors, paddle or vibratory dischargers, and feeders to feed pressure or vacuum conveying systems.



3. **Use bins** – Sometimes called day bins, these intermediate size bins provide short-term storage of sifted flour closer to the use points than the storage silo. This allows more efficient conveying and sifting from the silos and allows routine sifter and silo maintenance to be done during operating hours. Use bins may have multiple outlets to serve several conveying lines. Use bins are typically sized to provide from one to four hours storage.



4. **Silo air dryers** – Condensation can be a problem in silos, especially outdoors. Pfening offers optional dehumidification systems to supply dry air to the silos, reducing condensation problems. These consist of a desiccant air dryer, booster fan, safety valve, and control panel. The unit is mounted near the silo fill station and blows air through the fill tubes when they are not in use. Outdoor construction is available, but an indoor location is preferred, particularly in colder climates.



5. **Conveying air conditioning** – Flour is generally conveyed with ambient air, but there are instances when it is necessary to control the temperature and/or humidity of the conveying air to achieve the best results. Pfening can provide cryogenic flour cooling systems, conveying air chillers and dehumidifiers, all with associated controls.



6. **Bowl covers** – When a portable mixer bowl is to be filled from a scale hopper, Pfening offers an air-operated bowl cover, which covers the bowl during the filling operation to control dust. The cover is raised to allow the bowl to be moved, then the air cylinder clamps the cover tightly against the rim of the bowl during the filling operation. Standard construction is lightweight aluminum with stainless steel linkage. The underside of the cover is white, food-grade rubber. All stainless steel construction is available. The bowl cover may be equipped with nozzles for injection of water, oil, or liquid sugar. It may also have a hand door for manual addition of minor ingredients. The bowl cover may have a stainless steel support stand of its own or may share the support stand with a scale hopper.



7. **Hopper support stands** – If it is impractical to hang scale hoppers from the ceiling, Pfening can provide support stands. These may be as simple as a four-legged structural framework or may include complex walkways, access or service platforms, and pipe and tubing supports. They may be for single or multiple hoppers. Aluminum, stainless steel or mild steel construction is available.



## INSTALLATION, START-UP AND TRAINING SERVICES

Pfening provides complete installation, including startup and training. Experienced field supervisors, mechanical installers and electricians are always available. Expert Pfening engineers will commission the system or equipment and train the operators.

Pfening is ready to supply parts, service, and technical assistance today, next year, or in ten years. Pfening customers never have to pfend for themselves. For over 85 years we have guaranteed everything we sell with expert service and technical support. Our customers rule and we prove it every day.