

[www.Semi-Bulk.com](http://www.Semi-Bulk.com)

# Semi-Bulk Systems Company Profile

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Modular engineered process  
solutions involving dry ingredient  
handling and dry/liquid mixing

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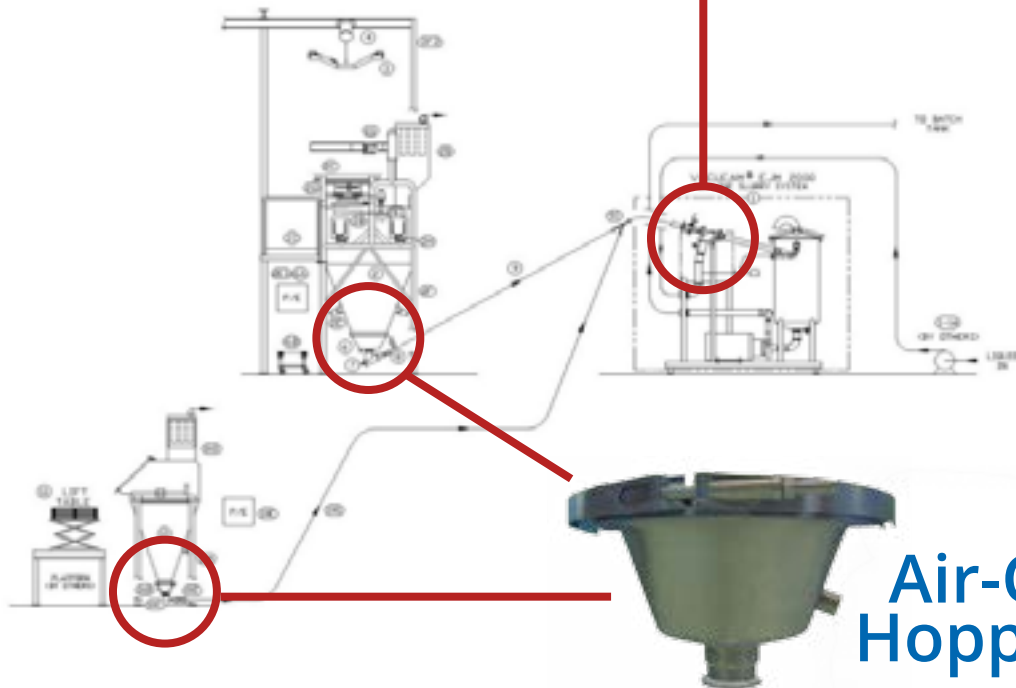
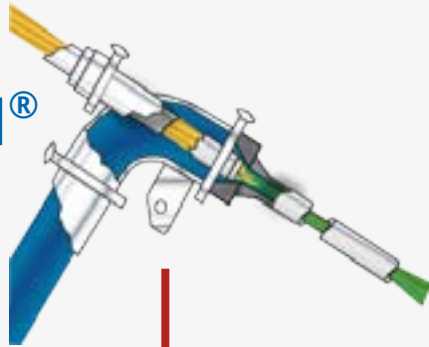
Semi-Bulk Systems, Inc. is considered a true partner in developing specific processes customized to maximize

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VACUCAM<sup>®</sup>  
Ejector  
Mixer



Air-Cone<sup>®</sup>  
Hopper

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## Semi-Bulk Typical System

Two Technologies = the TOTAL SOLUTION

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# THE TOTAL SOLUTION

SEMI-BULK SYSTEMS HAS PRODUCED THE HIGHEST QUALITY SYSTEMS FOR MORE THAN 43 YEARS AND IS ISO-9001 CERTIFIED TO MEET THE NEEDS OF OUR WORLDWIDE CUSTOMERS.

Semi-Bulk's unique technology offers 21st Century solutions that optimize process efficiencies and provide the lowest manufacturing costs to compete in today's fierce competitive environment. Semi-Bulk Systems has produced the highest quality systems for more than 43 years and is ISO-9001 certified to meet the needs of our worldwide customers.

Semi-Bulk Systems, Inc. is a world class provider of modular engineered process solutions involving dry ingredient handling and dry/liquid mixing systems. Our target markets are:

- **Dairy Mixes** – Ice Cream Mix/Yogurt Mix & Milk Powder Rehydration
- **Beverage Mix Processes**
- **Sugar Liquefaction**
- **Dressing & Sauces**
- **Meat Processing** – Pickle, Spice and Brine Processes
- **Pharmaceutical and health care**
- **Paint Plant /Paper Plant** -- Pigment Dispersion & Thickeners; Chemical Processes; Mining Processes
- **Power Plant** – Flue gas stack treatment- -Land and Marine: Flue gas de-sulfurization [FGD] w/ Limestone and MgO; Hg Control w/ Powdered Activated Carbon [PAC] processes; NOx mitigation w/ Urea solution for a cleaner environment.
- **Oil Field Fracking** and Forest Fire Fighting Chemicals
- **AIR-PALLET® Container** – Specialized returnable/reusable semi-bulk shipping containers for powder products; w/ built-in fluidizable pallet for total dust free filling and unloading.



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We provide our customers with the opportunity to see their product produced in our pilot plant or in their facility. We then present a written Process Performance Guarantee.

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# REVOLUTIONARY APPROACH

OUR PATENTED PROCESSES AND OUR MODULAR SKIDDED APPROACH TO PROVIDE A TOTAL SOLUTION FOR BOTH DRY SIDE AND DRY/LIQUID MIXING HAVE REVOLUTIONIZED THE MARKETS WE SERVE.

Semi-Bulk Systems, Inc. is considered a true partner in developing specific processes customized to maximize competitive and profitability positions. We enter into strict confidentiality agreements that allow us to completely understand each customer's products and their primary objectives. We dig deep to identify formula constituents, volume requirements, cycle times, facility logistics and more. We provide our customers with the opportunity to see their product produced in our pilot plant or in their facility. We will then present them with a written Process Performance Guarantee for the process we have presented. Our proposals include a description of the many benefits that will be realized by making the change to our Dynamic Mix Making Technology. This breakdown of benefits is what we call: Process XstreamLining<sup>SM</sup>.

The Vacuam<sup>®</sup> Technology provides new and valuable benefits versus traditional methods. Process control automation is critical in assuring proper sequencing, loss in weight delivery or Dynamic Continuous Steady State processing with accuracy, consistency of mix quality and total quality control.

Our patented processes; our modular skidded approach to provide a Total Solution for both dry side and dry/liquid mixing; and our focus on providing major benefits vs. traditional processes have revolutionized the markets we serve. The major production benefits achieved by applying our technology to realize the huge rewards of Process XstreamLining<sup>SM</sup> cannot be accomplished w/ traditional systems. After the installation of our technology in their initial plant to replace traditional systems, our Customers often adopt Semi-Bulk processes as "best available technology" and will make a companywide roll-out to experience immediate cost savings and a competitive position in their markets.

Let's look at each market in detail on the following pages.

## FOOD/DAIRY

### Milk Powders, Cheese, Ice Cream, Yogurt, Thickeners, Dressings, Sauces

Complete dispersion of whey and milk proteins, gelatin, pectins, gums, starch, sugar and all other dry ingredients typically used in the manufacture of pourable dressings, dips and sauces. Vacuam® Processes are designed and built to USDA/3A specifications and include CIP compatibility of all components on both the dry and the wet sides of the process.



Several Vacuam® processes are specifically designed for the Dairy Industry; they include Frozen Desserts, Yogurt Mix, Milk Powder Reconstitution and Sugar Liquefaction.



Key benefits to the dairy industry include:

- COLD dispersion capability
- Separation of dry powders from wet process areas
- No damage to fat globules in milk or cream
- Full CIP capability
- Clean, dust free operation
- Meets 3A/USDA standards
- Higher capacity, less time, less labor, greater automation
- Less energy utilized
- Improved quality control



## PROCESS XSTREAMLINING<sup>SM</sup> BENEFITS FOR FOOD/DAIRY

### Dairy Experience

Semi-Bulk Systems has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Dairy processes. This technology offers many benefits versus conventional processes.



### Benefits

- **High Capacity Processes** – Increase plant capacity, reduce shifts, reduce number of plants
- **Greatly Reduced Labor** – Reduced labor costs per unit output
- **Increase Process Efficiencies**
- **Increase Product Yields**
- **Total Automation** – Elimination of possible errors
- **Greater Accuracy** – Confirm batch addition per individual batch menu
- **Reduced Energy Requirements**
- **Reduced Maintenance / Replacements**
- **Improve Safety / Environmental / Ergonomics / GMP**



# BEVERAGE

CSD Processes • Sports Drinks • Tea • Nutritional Drinks • Energy Drinks  
Juices • Dairy Beverages • Flavored Water

The VACUCAM® Modular Dynamic Beverage Batching Stations offer the total solution to meet all of your mix room needs ---for today's immediate challenges and tomorrow's changing requirements and capacity demands, NOW & FOR THE FUTURE. New Beverage introductions require new or additional process requirements.



- To handle changing ingredients that cannot be mixed efficiently with traditional mix stations or mixing technology.
- To handle bulk bag addition of ingredients as well as small packages for dry and liquid minors.
- To handle the changing needs for sweeteners and addition of totally new ingredients.



Modular Design To Expand Process Capabilities for a TOTAL Mix process:

- Meet growing and changing demands with Modular additions to same system.
- Build total sustainable process for ALL mix requirements.
- Accommodate dry feed from paper bag, drums, bulk bag or bulk.

## PROCESS XSTREAMLINING<sup>SM</sup> BENEFITS FOR BEVERAGE

### Beverage Experience

Semi-Bulk Systems has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Beverage Manufacturing. This technology offers many benefits vs. conventional processes.

### Benefits

- **Multi-functional design** allows for maximum utilization. Rapidly disperses ALL dry and liquid ingredients.
- **Sugar-on-demand** – Eliminate need for sucrose syrup storage. Deliver batch quantity directly into blend tank.
- **High Capacity Rates** – Can feed several bottling lines.
- **Efficient use of process and C.I.P. water**
- **Low / No maintenance** – Pump is only moving part.
- **Automation** – Reduced batch time and labor
- **Low Energy Usage**
- **Improved Operator Safety & GMP**
- **Floor level operation**
- **Eliminate operator platforms.**



**Single Pass**  
Mixer on a Stand (MOS)



**Batch**  
Dynamic Batch/  
Continuous Batch



**Steady State**  
Dynamic Continuous  
Steady State Process

# SUGAR LIQUEFICATION

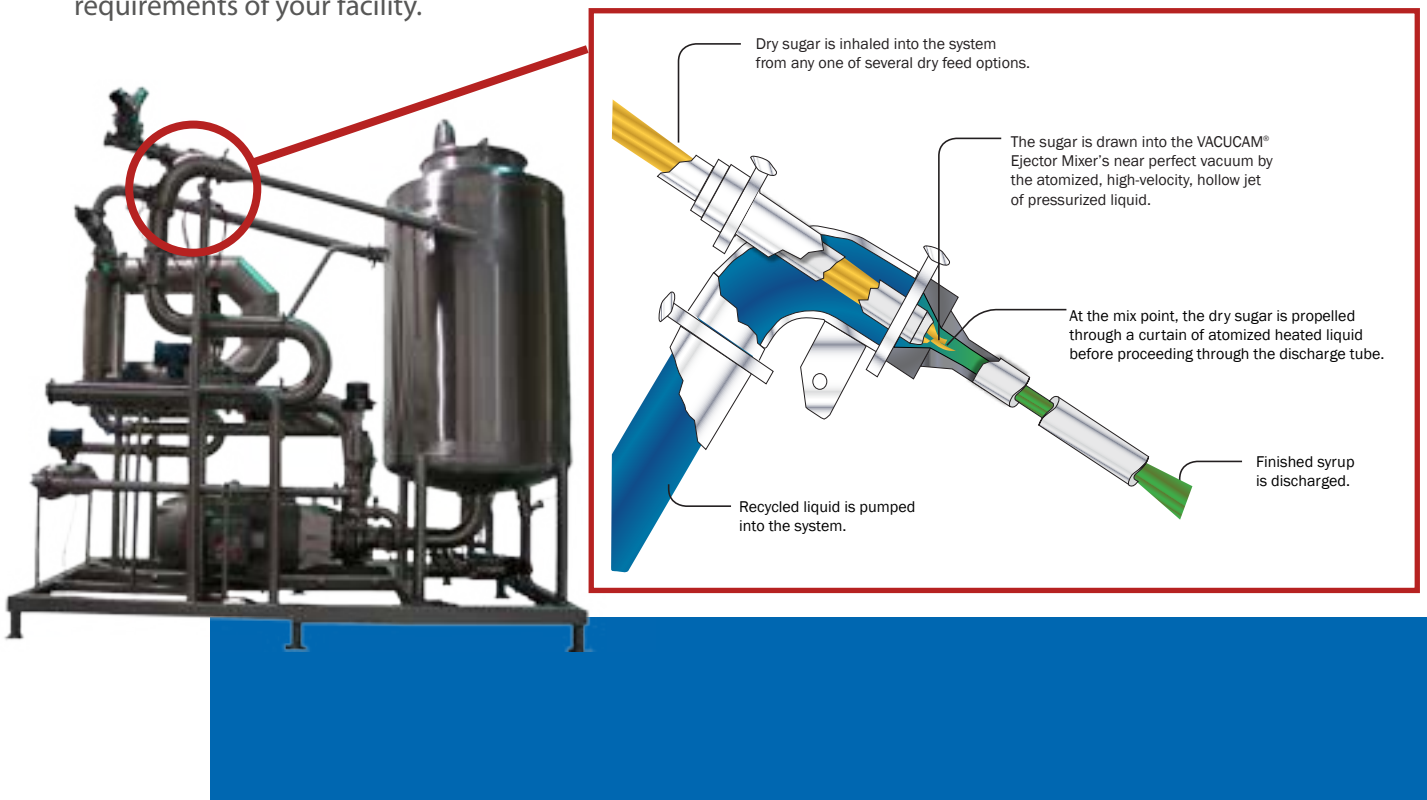
The modular schematic matrix of process options addresses SBS' capability to provide the complete turnkey process design. From the total dry side capability with bulk bags, with bulk truck or bulk rail unloading, silo storage, conveying, liquefaction, and transfer to process area.

The total expertise of dry side handling will provide all of the safety design considerations to meet new explosion design guidelines, humidity control in storage and bulk conveying of dry ingredients. Experience in bulk bag handling and rapid handling unload stations complement our "Total Solution" for sugar handling and also offers options for additional utilization of the system for other bulk bag ingredients.

The Semi-Bulk Sugar Liquefaction Process system is available on a pre-packaged modular skid in three process options:

- Automated Dynamic Continuous Steady State,
- Automated Batch/Continuous Batch, and
- Automated Dynamic Batch.

SBS will help you select the process based on your capacity and existing process needs and logistical requirements of your facility.



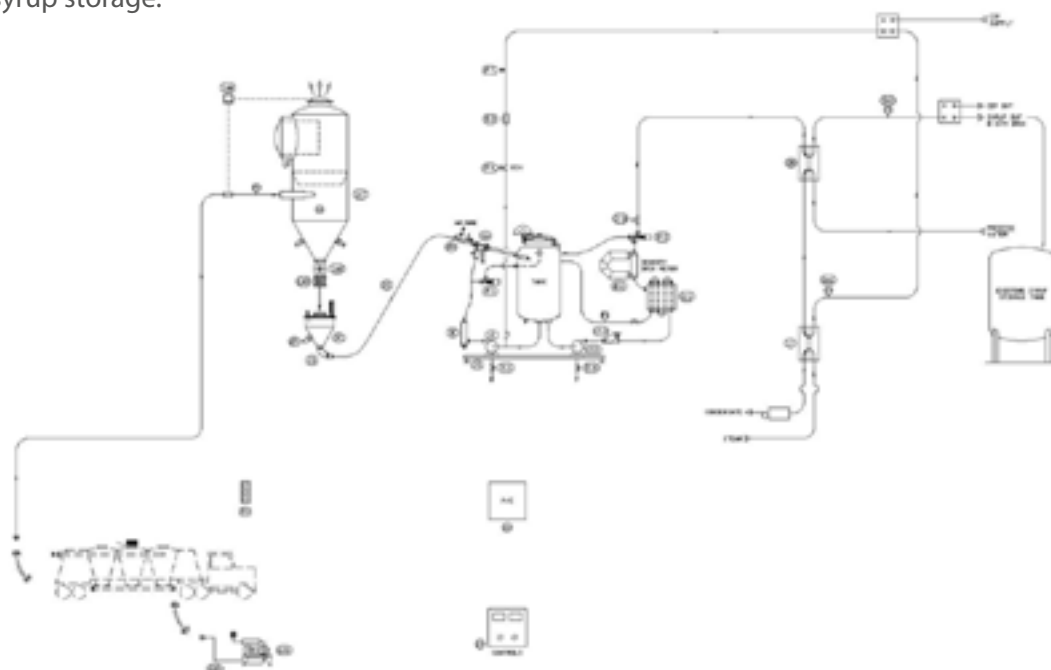
## PROCESS XSTREAMLINING<sup>SM</sup> BENEFITS FOR SUGAR LIQUEFICATION

### Sugar Liquefaction Experience

Semi-Bulk Systems has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Sugar Liquefaction process. This technology offers many benefits vs. conventional processes.

### Benefits

- **Reduce inbound syrup transportation costs** by more than 32%.
- **Significantly reduce raw material cost** by buying granular sugar on the open market – better control your sugar supply problems and costs.
- **Eliminate quality issues** related to caramelization by lowering the process temperature & controlling water quality.
- **Eliminate supplier and storage problems** by moving syrup production in-house.
- **Reduce maintenance** with minimal mechanical process components.
- **Reduce Energy costs**
- **High Capacity** to meet any requirements.
- **Totally Automated Process Options** to meet your process needs
- **Provide On-Demand syrup to beverage blend tanks** – Eliminate need for syrup storage.



# POWER PLANTS

## FGD, MgO to MgOH<sub>2</sub>, MRCS, NO<sub>x</sub>

The VACUCAM® Ejector Mixer system offers several high capacity processes for efficiently making slurries for flue gas scrubbing. The Systems are typically designed for single pass processing of 30%+ solids. The VACUCAM® Ejector Mixer units represent the heart of the process, providing major benefits that cannot be achieved with traditional mechanical mixers.



Includes Processes for Scrubber treatment of effluent gasses including:

FGD

**Flue Gas Desulfurization (FGD)** The most efficient FGD processes for making Limestone Slurry can be provided by using pulverized limestone vs. the traditional wet ball mill process utilizing crushed limestone. The wet ball mill process requires a considerable commitment by the power plant requiring considerable operation cost, maintenance costs and energy costs with less than reliable slurry production.

MgO<sub>2</sub>

**MgO to MgOH<sub>2</sub>** Process for conversion of MgO to MgOH<sub>2</sub> for treatment of SO<sub>2</sub> aboard all ships to meet the international effluent agreements to become effective in 2020. Semi-Bulk's process has been approved by the major Chinese scrubber company for ship applications.

Hg

**Mercury Re-Emission Control System [MRCS]** uses Powdered Activated Carbon [PAC]. Two highly efficient processes to handle activated carbon from Silos to dispersion processes to injection into the scrubber process offer the most efficient process for Hg control.

NO<sub>x</sub>

**Selective Non-Catalytic Reduction** process – Utilizing Urea Solution for reduction of NO<sub>x</sub> effluent. SBS offers a Continuous Steady State modular process for handling of Urea prill into urea solution. The modular process is a highly efficient endothermic reaction process.



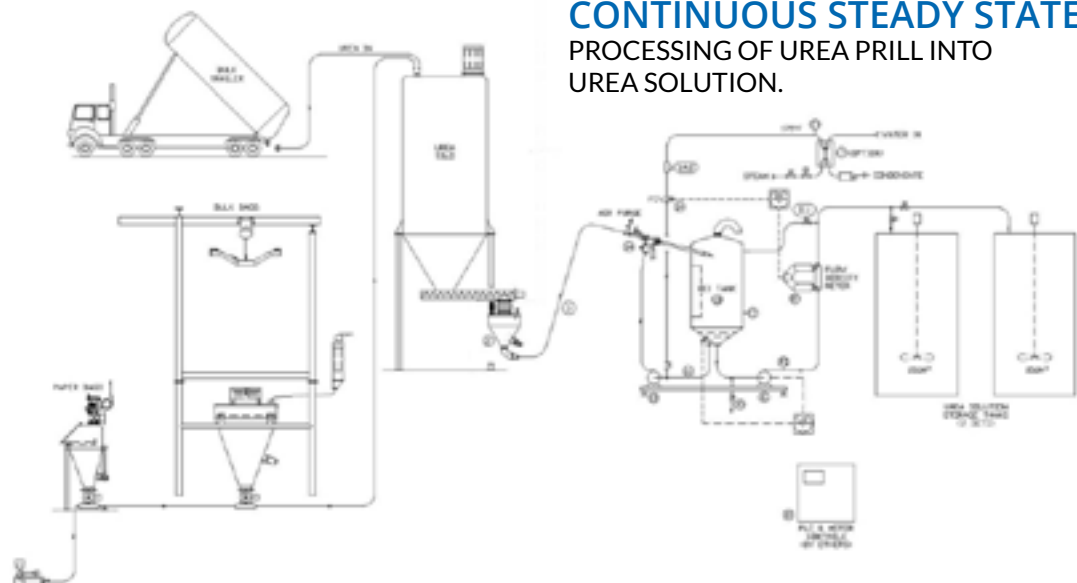
## PROCESS XSTREAMLINING<sup>SM</sup> BENEFITS FOR POWER PLANTS

### Power Plant Experience

Semi-Bulk Systems has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Slurry Processes. Technology offers many benefits vs. conventional slurry processes.

### Benefits

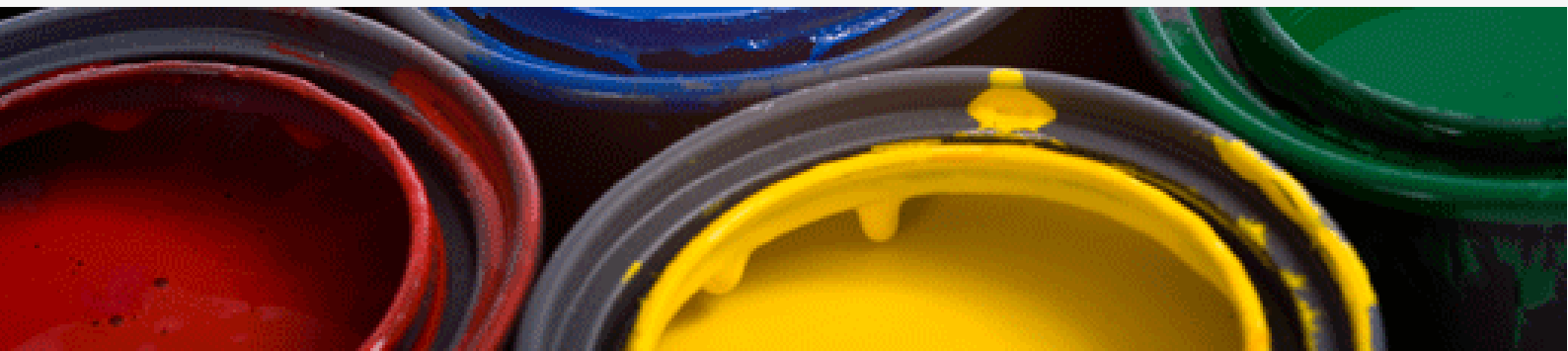
- Direct In-Line single pass mixing. No moving parts.
- Produces high quality slurry mix w/ rapid and maximum surface area contact to maximize reaction
- Very low energy usage-save 50-90%
- Direct Injection – no /minimal slurry storage required.
- Totally enclosed mixing system – minimal/no dust
- Small footprint required
- Totally Automated-Immediate start and stop of process.
- Minimal maintenance—very reliable—no scheduled maintenance downtime required
- High quality slurry mix provides maximum contact and reaction rate while maximizing process yield.
- Minimal/no dust control required
- Minimize real estate requirements
- Easily automated and fine tuned to optimize chemical additions with direct feedback from on-line analyzers.
- Lower operating Cost in terms of manpower, maintenance & operating costs
- Lowest Cost of Ownership



# PAINT MANUFACTURING

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Semi-Bulk Systems offers the Paint Industry two major process solutions to achieve the most efficient paint making plants.



## Mixing of Thickeners

The first solution addresses hydration, dispersion and rapid mixing of thickeners. The VACUCAM® Ejector Mixer Technology offers major benefits to the paint industry for rapid and very efficient hydration of ALL thickeners, including gums, cellulosics, polymers, starches, stabilizers, with rapid and total hydration of dry functionalizing ingredients.

Processes are available to address the logistical requirements of any plant and to provide capacities to meet any production requirements. In most cases, a single system can be configured to provide capacities to meet all plant requirements. Either the Mixer on a Stand [MOS] or the EJM 2000 Systems can incorporate paper or bulk bag handling.

## Slurry Making for Pigments & Extenders

The second solution addresses rapid, efficient and high capacity slurry production for paint formulations and/or master slurry production.

This process offers the paint industry the capability to increase TIO<sub>2</sub>, CaCO<sub>3</sub>, Clay, Silica, slurry capacity by 300-400% with fewer personnel, with greater than 75% energy savings per ton of slurry, with consistent dispersion quality, and with significant reduction in COGS per gallon of paint.

## PROCESS XSTREAMLINING<sup>SM</sup> BENEFITS FOR PAINT MANUFACTURING

### Paint Manufacturing Experience

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Semi-Bulk Systems has applied its technology and offers experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Paint Manufacturing. Technology offers many benefits vs. conventional processes.

### Benefits

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- Automation, control and validation of ingredient additions
- Greater efficiency and consistency in mixing and consistency of finished product
- Improvement in ergonomics, environmental, safety and GMP
- Increased capacity
- Reduced labor
- Reduced operator error
- Much greater operation flexibility

### **POWDER DELIVERY OPTIONS:**

Powder delivery options are automated to support the high capacity slurry production units. They include:

- Total bulk from Silo with automated pneumatic convey delivery to the Continuous Steady State feed hopper.
- Semi-Bulk Containers – dedicated returnable/reusable Air-Pallet® container supply w/delivery to in-plant bulk bin storage.
- FIBC supply to bulk bag unload and surge bin feed system feeding the Continuous Steady State Slurry process.

## PAPER PLANTS

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Paper Coating Slurries (TiO<sub>2</sub>, CaCO<sub>3</sub>, Clay, etc.) can be produced at very high capacities using the VACUCAM® Continuous Steady State Slurry Process. This process offers the Paper Coating industry the capability to produce slurries on demand directly from dry pigment silos, with consistent dispersion quality. Also this process provides the option to purchase dry pigment and produce slurries directly from rail car or hopper truck delivery and pump the finished slurry directly into slurry storage tanks, thus eliminating the higher cost of slurry pigments and freight costs for shipping water.

The modular process designs used for paint manufacturing delivers the same major benefits and cost savings for the paper industry.

### Benefits

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- Automation, control and validation of ingredient additions
- Greater efficiency and consistency in mixing and consistency of finished product
- Improvement in ergonomics, environmental, safety and GMP
- Increased capacity
- Reduced labor
- Reduced operator error
- Much greater operation flexibility



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### Paper Kitchen Processes

In addition to the processing of the high capacity pigments and fillers, Semi-Bulk Systems provides total solutions to address all of the requirements for kitchen formulations addressing starches, thickeners, gums and other functionalizing ingredients. Since Semi-Bulk Systems' early

# CHEMICAL INDUSTRIAL MARKETS

Since Semi-Bulk Systems' early background was primarily in the chemical industry, its main focus covered all Industrial Markets. Semi-Bulk rapidly confirmed that the technology related to powder handling and powder/liquid processing, provided major processing benefits to all related Industrial markets.

## Industrial Industries

Through the company's application of Process XstreamLining<sup>SM</sup>, we can demonstrate major process benefits and cost reductions. The company has developed and introduced standard modular processes to address key process markets including:

- **Power Generation** – Limestone Slurry processes for FGD, MgO slurry process for ship scrubbers; Hg treatment utilizing [PAC] Powder Activated carbon; NOx reduction for Selective Non-Catalytic Reduction process –utilizing Urea solution.
- **Paint Plants** – Processing of thickeners and high capacity, high solids pigment dispersions
- **Paper Plants** – Processing of thickeners and high capacity, high solids slurring of coatings
- **Chemical Processes** – All processes involving dry handling and dry/liquid mixing
- **Mining** – Chemical processes utilizing high capacity Dynamic Continuous Steady State [DCSS] processes for soda ash and lime slaking exothermic process reactions.
- **Forest Fire Fighting**
- **Oil Field** – Fracking
- **Wall board production**
- **Specialized processes** – In addition to the standardized modular processes, the company provides solutions and major benefits through custom design processes





# AIR-PALLET® CONTAINER

Family of Collapsible Shipping Containers  
developed by Semi-Bulk Systems

## Models:

- Round, Large Rectangular, Mini
- 15, 35, 50, and 85 cubic foot capacity
- 4100 pounds max loading
- Urethane sidewall material
- Collapsible, returnable, reusable





## FROM THE BEGINNING

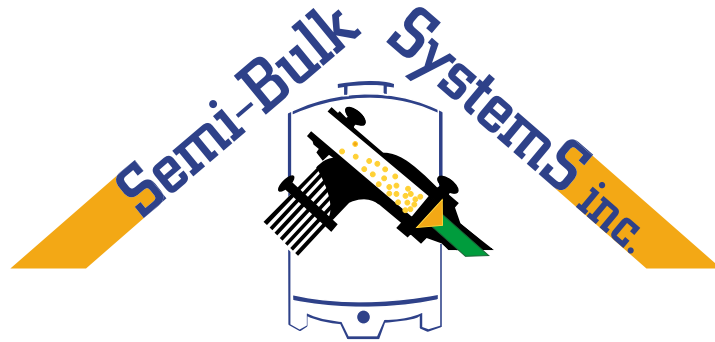
Since its inception in 1975, Semi-Bulk Systems, Inc. manufactured and sold a proprietary FIBC known as the Air Pallet® Container. The founders of the company named their company Semi-Bulk Systems, Inc. and were also co-founders of the FIBC Committee which continues to be an active organization. With emphasis on “green” and reduction of land fill, the returnable, reusable Air-Pallet® Container offers even greater opportunities in many countries promoting the reduction of packaging waste.



From the beginning, Semi-Bulk Systems Inc. has served customers in the chemical markets. The Air Pallet® Container was designed exclusively for the fine powdered specialty chemicals. This container continues to be ideally suited for both shipping and delivering these chemicals to a process in a dust free, totally enclosed environment. The package carries the D.O.T. (Department Of Transportation) exemption for shipping and handling hazardous chemicals. Chemical industry customers also find our total processes attractive for delivering chemical slurries to reactor vessels inline, or mounting a mixer on a tank, keeping the vessels sealed. Processes are routinely designed for all levels of hazardous classifications. High capacity processes have been provided for solvents, acids, silicas, polymers, starches and a range of functionalizing ingredients.

Both the Vacuam® Ejector Mixer and the Air-Pallet® Container technologies were initially developed to support the development of systems for Forest Fire Fighting. The Vacuam® Ejector Mixer remains the process of choice for rapidly mixing chemicals in fighting forest fires and is used worldwide to help maintain a green environment.





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# COMPANY PROFILE 2018

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