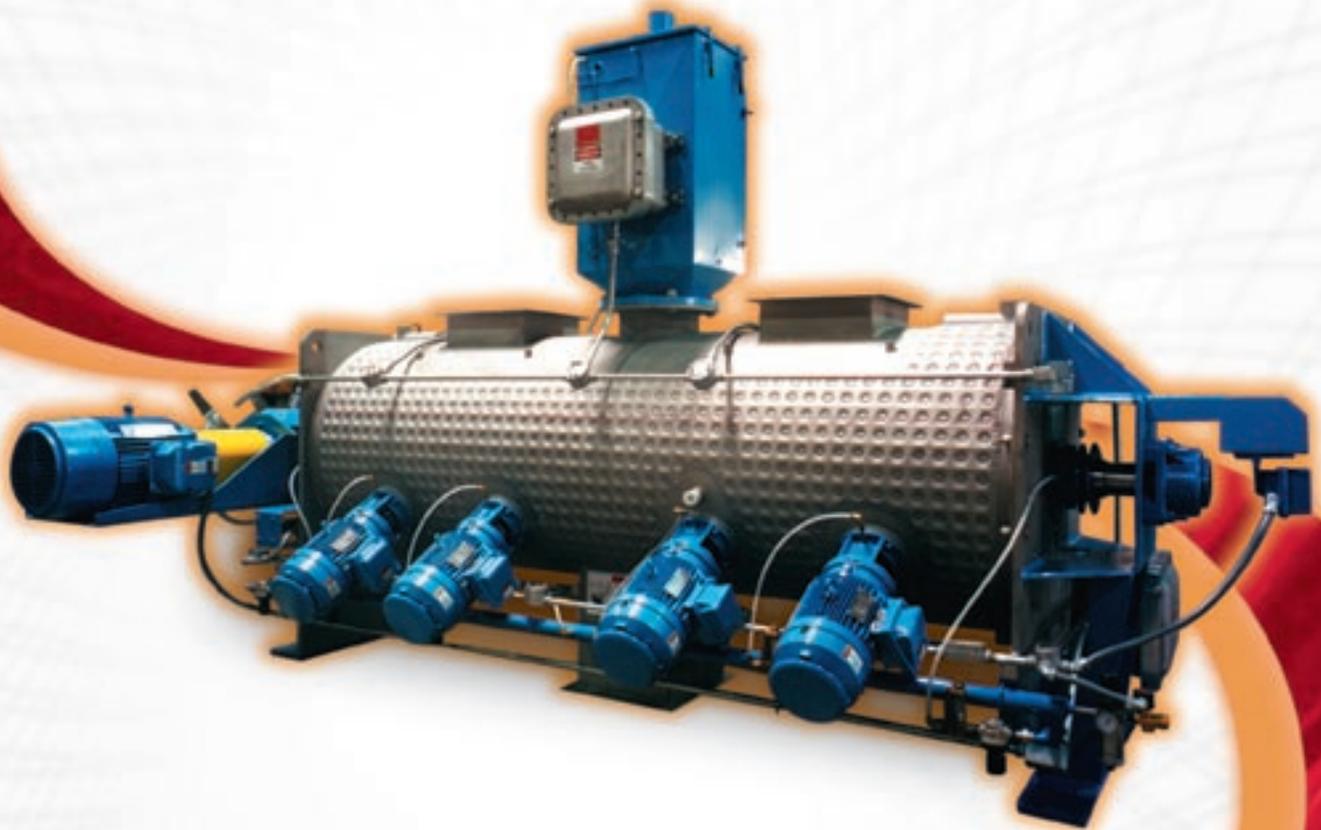




# **PLOWBLEND™**

**HIGH-INTENSITY MIXERS**



*Process Driven Solutions  
for Mixing, Reacting & Drying*

- ☛ Blenders
- ☛ Conductive Dryers
- ☛ Vacuum Dryers
- ☛ Reactors





The Eirich Group's 70,000 square feet, state-of-the-art manufacturing facility at Gurnee, Illinois

# American Process Systems

## 125 Years of Manufacturing History

American Process Systems is a 25 year old manufacturer of ribbon blenders, high intensity plow blenders, Forberg fluidized zone mixers, bag dump stations, viscous pumps, conical mills and high speed finishers. Designs, experience and expertise are focused on the food, pharmaceutical and other sanitary industries.

In 1993 APS became a member of The Eirich Group, a 125 year old, German based manufacturer of high intensity mixers for foundry, battery paste, ceramic and other heavy duty industrial applications.

## Scope of Delivery

APS manufactures approximately 150 mixers each year in our Gurnee, Illinois manufacturing facility. Equipment ranges in size from one to 1,500 cubic feet, batch or continuous, U-shaped or cylindrical, in a variety of materials.

We are also routinely tasked with more of the upstream and downstream system components, including storage, weighing/scaling/dosing/feeding, controls, screening, milling, transfer, and dust collection equipment necessary for complete system integration and single source responsibility.

## Manufacturing Capabilities

The synergy of the two merged corporate cultures has produced a growth oriented company that offers our customers an unequalled base of experience, affordable quality, and innovative technology.

The Eirich Group has a combined staffing of 1,500 employees worldwide. Our own 70,000 square feet manufacturing facility in Gurnee, Illinois, houses a staff of 150. We are an ASME certified shop, authorized to design and build pressurized vessels in house.



# Process Solutions Through Technology & Innovation

## Overcoming Effects of Gravity, Particle Shape, And Product Density For a More Homogenous Mix

American Process Systems' High Intensity Plow Blenders incorporate several mixing/blending implements designed to create a fluidized bed of product, mixing ingredients with minor additions of 1 part per million.

A high speed, solid shaft rotor within a horizontal, cylindrical tank creates a "fluidized bed", making the materials, in effect, weightless. Wedge-like plows or specially angled paddles sweep through and lift the product. Both are designed to keep all material in the chamber in constant motion. Airborne particles are continually moved in multiple directions to overcome effects of gravity and negate limitations of particle size, shape, or density to achieve homogenous mixes in short mixing cycles.



Twelve high speed choppers on this Plow Blender achieve high shear and maximum dispersion.

## Applications

High Intensity Mixers are ideal for mixing solids to solids, liquid to solids, or even solids to liquids, in a wide variety of food, pharmaceutical, chemical, plastics, and similar industries.

*All APS High Intensive Mixers, Reactors, and Dryers are offered with these standard features:*

### Plows

- Provide continued lateral motion
- Are generally more effective for agglomeration

### Paddles

- Achieve higher end-to-end transfer

### Choppers

- Increase dispersion
- Help size agglomerates
- Provide tighter cuts

### Durable Rotor Design

- Solid agitator shaft

### Effective Shell Design

- Cylindrical
- Fully swept interior
- More efficient for
  - cooking
  - cooling
  - vacuum/pressure reactions
  - vacuum drying
- Choice of dimpled or standard jacketing (ASME certified)

### Choice of

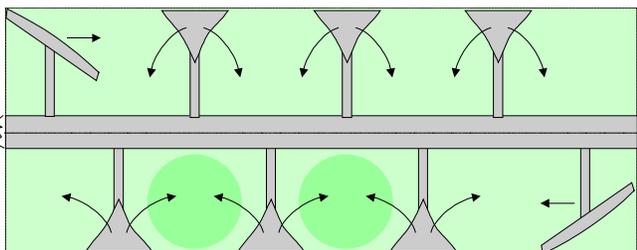
#### Length-to-Diameter Ratios

- Smaller L:D ratios provide more efficient mixing and end-to-end transfer
- Larger L:D ratios provide maximum jacketed surface area for applications such as drying

### Easy Scale Up

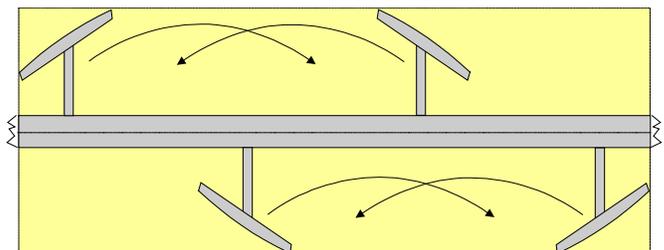
- Scale up from lab or pilot plant to production size equipment

## Comparing Product Flow in a High Speed, Cylindrical Vessel



### Plow Configuration:

Plow tools cut through the product to produce a random pattern



### Paddle Configuration:

High speed paddle tools lift the product to produce a very specific mixing pattern

# Custom Engineered Solutions

## Design Flexibility

American Process Systems has earned the same reputation in the high intensity mixer markets that we have always enjoyed for our low intensity ribbon blenders: Combining solutions oriented engineering with design flexibility and manufacturing know-how to provide individualized process solutions at highly competitive prices.

## Manufacturing Know-How

### ASME Certified Facility

Our manufacturing facility in Gurnee, Illinois, is an ASME (American Society of Manufacturing Engineers) Code certified workshop for the manufacture of pressurized vessels. APS offers jacketed mixers for heating, cooling, and vacuum applications from our own fabrication.

### USDA/FDA Compliant Designs

Upgrades to our complete line of GMP sanitary mixers can meet or exceed USDA, Dairy, FDA, and other government regulated application requirements.



CPB-90 Vacuum Dryer for drying and enhancing the color of organic pigment. Unit has hydraulic drive, tubular load cell base, spherical disc valve, and charge inlet with davit arm.

### High Speed Plow & Paddle Blenders

- Capacities from 2.5 ft<sup>3</sup> to 1,200 ft<sup>3</sup>
- Batch or continuous operation

### Materials of Construction

- Stainless Steel: 304, 304L, 316, 316L, 17-4
- Hastelloy C-276
- Alloy 20
- Duplex RA2205

### Direct And Indirect Heating & Cooling, via

- Live steam injection directly into mix
- ASME dimpled and labyrinth style jackets
- Hollow, heated agitator shafts

### Corrosion And Erosion Resistant Internal Coatings

- Kynar
- Rubber
- Halar

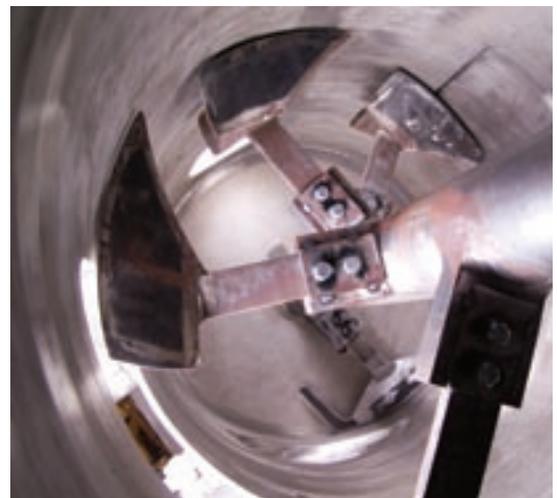
### High Shear, High Speed Choppers

### Abrasion Resistant Construction

- AR 200 & AR 400
- Hardened 17-4 stainless steel
- Tungsten carbide wear strips

### Dryers & Reactors

- Full vacuum
- Pressures to 700 psi (48 bar)
- Temperatures to 700° F (370° C)



# Process Solutions with Reactors & Dryers



## Low Cost Solutions For Multi-Step Processes

Whatever your process requirements, a properly designed, all-in-one, high intensity, cylindrical plowblender will produce more batches per day with smaller capital investment, lower installation and operating costs, and less consumed energy than comparable multi-piece solutions.



## All-in-One Process Reactors

Reacting, drying, vacuum drying, or any combination thereof, can be achieved in a single, vacuum/pressure capable vessel with ASME heating/cooling jacket, high speed plow or paddle agitator, and high speed choppers.

The fully swept cylindrical shell with flat endplates limits build-up of adhesive or wetted powders, filter cakes and sludges. The turbulent action of the agitator creates high particle transport ideal for adding liquids, coating, chemical reactions, or granulating.



## Faster Processing

Elevating internal pressures in the mixer with the addition of indirect heat can drive a reaction forward. It presents a very efficient tool for drying, cooking, remediating/neutralizing, sterilizing, or extracting.

Turbulent forces created by a high speed agitator in combination with the shear and dispersive forces generated by choppers ensure optimal heat transfer due to maximized contact with the product surface area. This allows products to efficiently pass from paste to granule to powder while limiting balling or caking.

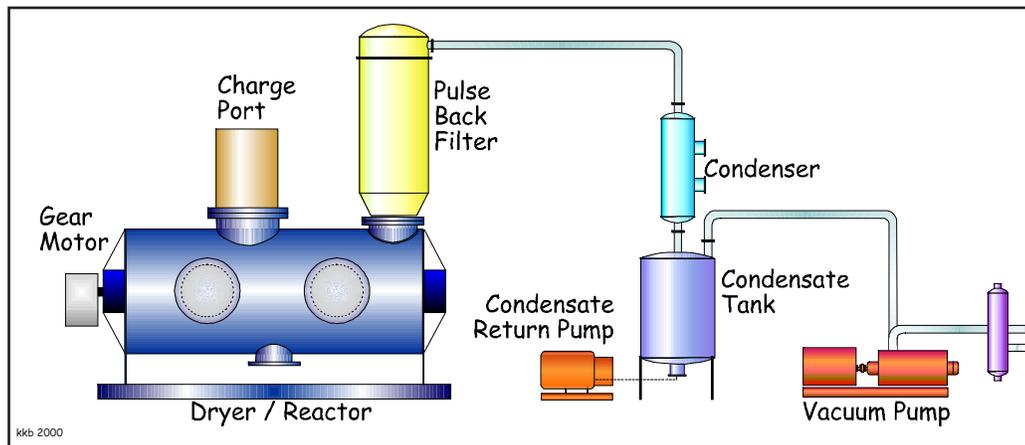
## Solutions For Heat Sensitive Products

Vacuum drying systems consist of a jacketed mixer, a vacuum pump, and a dust collector for product recovery. High internal vacuum levels lower vapor pressures further shortening drying times.

Vacuum dryers allow thermal processing of heat sensitive products because vacuum lowers the temperature at which liquids or volatiles vaporize.

## Fast Phase Changes

Phase changes are fast and efficient. Exothermic reactions may require external jackets to prevent reaction runaway. A high horsepower mixer configuration will readily convert a thixotropic paste into a powder. Color and flavor changes can be achieved in a single vessel acting as a process pressure reactor.



Typical Vacuum Dryer System:

Vacuum pump with bin vent filter/vapor dome and vacuum pump with or without condenser.

# Process Driven Solutions Through Experience

## Over 5,000 Units in Operation

APS' and Eirich's installed base today exceeds 5,000 units worldwide and ranges from individual machines to turnkey



CPB-1200 Cylindrical Reactor rated 150 psi internal pressure, Alloy 20, ASME heat jacketed

## Cylindrical Shells for Efficiency

Cylindrical Shells find application when vacuum or pressure or heating/cooling is required. A cylindrical shape withstands these higher pressures with minimal increase in shell thickness. Also, the fully swept cylindrical shell offers more jacketed area in contact with the product for effective heating or cooling.

## Handling Explosive Dusts

There are three ways to handle explosive dusts: by venting through explosion vents, through inert gas purging, or by explosion containment. The cylindrical shape of plow blenders lend themselves to ASME code rated vessels capable of containing an explosion.

### Typical Installations Include—

- Animal Feed
- Baby Food
- Baking Ingredients
- Bar & Liquid Soaps
- Battery Mixes
- Carbon Black
- Cereal
- Chemicals
- Chocolate
- Toner
- Dairy Products
- Detergents
- Explosives
- Fertilizers
- Flyash
- Friction Brake Material
- General Food Stuff
- Metal Powders
- Mineral Pigments
- Pasta
- Pharmaceuticals
- Many others

### Trouble-Free Process Integration through—

- Matched components
- Equipment tailored to application
- Application expertise



CPB-135 designed as a vacuum dryer/reactor for "dutching" cocoa - delivered as a complete system with jacketed dust collector and vacuum pump.

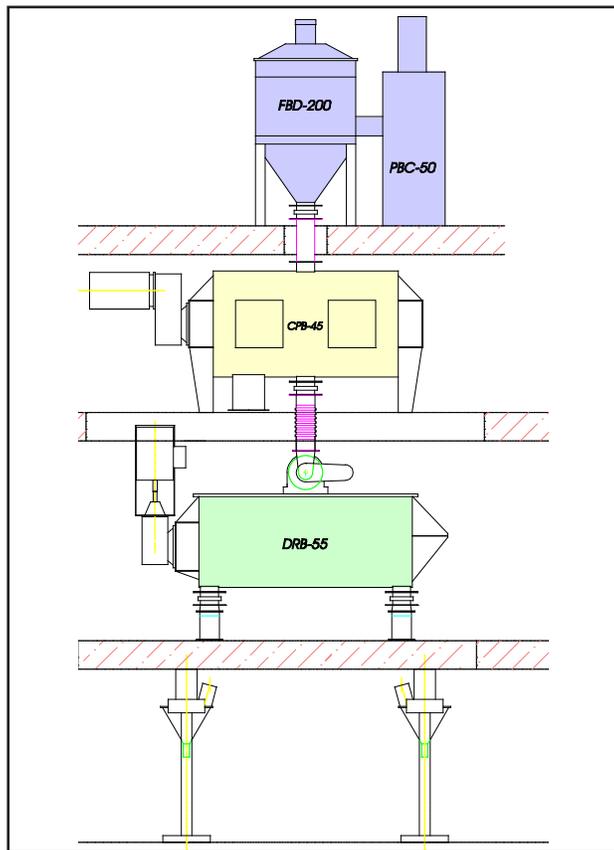


CPB-175 with shaft mounted gear box, scoop mounted motor, and fluid coupling, plus compressed air header for shaft seals.

System shown was engineered and constructed for lecithinating whey powder drink mix: Bag Dump Station and Super Sack Dumping on top floor, gravity flow to high intensity Plow Blender, discharging through centrifugal screener into half speed agitated surge hopper (DRB-55). Dual end discharges simultaneously feed four packaging lines



CPB-45 for corrosive rubber reclamation application. Mixer is Kynar® coated carbon steel with Hastelloy components.



APS maintains an inventory of mixers, dryers, and reactors with switchable tools (paddles/plows) for testing at our test lab (below), or in-plant testing. (Shown T 4.5 with Paddles)



Our fully equipped test lab includes ancillary equipment such as this vacuum pump for reacting and vacuum drying

## Solutions through Value Test It!

### Finding Out What Works Best With *Your* Product

How do you know the mixer will do the job? Whether plows or paddles will be more efficient? Or, which system configuration will optimize your process?

Our fully equipped test lab in Gurnee, Illinois, is the perfect setting for a side-by-side test to determine which mixer configuration will work best with your product, or even which type of mixer to choose. Our test equipment is also available for in-plant testing at your facility.

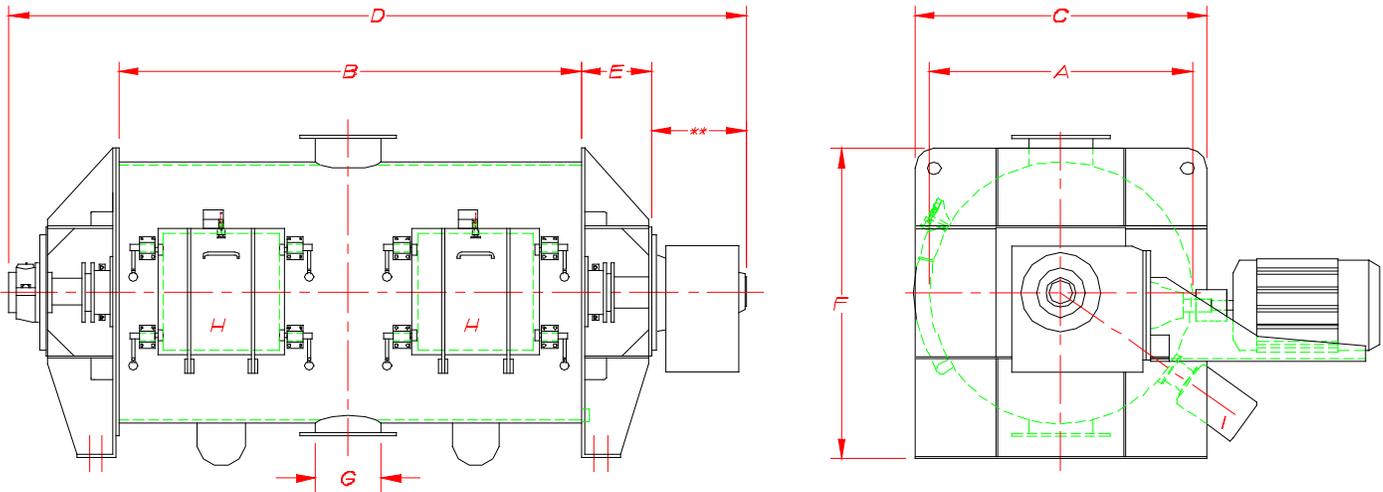
## Customer Service

### Experience, Responsiveness, And Service

Customer Service at APS begins with our sales personnel and manufacturer's representatives with years of processing experience. It encompasses engineers ready to assist you in developing the best technological solutions; startup support; operator training; and prompt field service calls and spare parts delivery.

# General Arrangement & Sizes

4/2000 Printed in the U.S.A. Subject to changes



Model	CPB-6		CPB-12		CPB-18		CPB-30		CPB-45		CPB-60		CPB-90		CPB-135		CPB-175		CPB-350	
Tank Diameter (inches   cm)	A	25   64	30   76	34   86	34   86	40   102	44   112	44   112	44   112	44   112	50   127	56   142	62   157	62   157	84   213	84   213	84   213	84   213	84   213	213   541
Tank Length (inches   cm)	B	40   102	48   122	60   152	60   152	72   183	78   198	78   198	78   198	120   305	120   305	132   335	156   396	156   396	168   427	168   427	168   427	168   427	180   457	457   1160
Working Capacity <sup>1</sup> (ft <sup>3</sup>   liters)		6   170	12   340	18   500	30   850	45   1,275	60   1,700	90   2,550	135   3,850	175   5,000	290   8,000	350   10,000	570   16,000	570   16,000	570   16,000	570   16,000	570   16,000	570   16,000	570   16,000	570   16,000
Holding Capacity (ft <sup>3</sup>   liters)		10   300	20   600	30   850	50   1,400	70   2,000	100   3,000	150   4,200	220   6,000	290   8,000	420   11,800	570   16,000	840   23,700	1,140   32,000	1,680   47,500	2,250   63,500	2,900   81,500	3,500   98,000	4,500   126,500	10,000   283,000
HP <sup>2</sup> (average range)		7.5-15	15-25	20-30	30-50	50-75	60-100	75-125	125-200	150-250	200-350	250-400	300-500	400-650	500-800	650-1,000	800-1,200	1,000-1,500	1,200-1,800	1,500-2,200
Width (inches   cm)	C	29   74	34   86	38   97	44   112	48   122	48   122	48   122	54   137	61   155	67   170	67   170	89   226	89   226	89   226	89   226	89   226	89   226	89   226	89   226
Tank Length (inches   cm)	B	40   102	48   122	60   152	60   152	72   183	78   198	78   198	78   198	120   305	120   305	132   335	156   396	156   396	168   427	168   427	168   427	168   427	180   457	457   1160
Overall Length excl. drive (inches   cm)	D	75   191	84   213	97   246	113   287	121   307	163   414	178   452	187   475	199   505	211   536	211   536	211   536	211   536	211   536	211   536	211   536	211   536	211   536	211   536
	E	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28	11   28
Height (inches   cm)	F	45   114	52   132	56   142	64   163	70   178	70   178	79   201	67   170	73   185	95   241	95   241	95   241	95   241	95   241	95   241	95   241	95   241	95   241	95   241
Discharge Flange (dia. in inches   cm)	G	6   15	6   15	8   20	10   25	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30	12   30
Number of access doors	H	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4
Number of choppers	I	1	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	6

Dimensions are approximate and vary with each application. <sup>1</sup> Working capacity based on 60-70% of total capacity. <sup>2</sup> Final HP determined by product/process requirements.

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## AMERICAN PROCESS SYSTEMS

Ask about other equipment by American Process Systems & Eirich Machines:



Ribbon & Paddle/Ribbon Blenders



Forberg Fluidized Zone Mixers



Viscous Pumps



Bag Dump Work Stations