

# Particle Processing Technology

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**Bēpex**

The Material Transformation People



# A message from our President

Welcome to Bepex International. We greatly appreciate the opportunity to work with you.

I have been with Bepex for many years, starting as a laboratory engineer in our Process Development Center. I have always been fascinated by the materials and challenges that we see in working with companies like yours.

We take pride in innovation by developing a process to transform your raw materials into finished products. We have an exclusive range of unit operations and solids processing technologies available to meet the most challenging applications.

We are committed to your success from initial inquiry and product development to ongoing commercial operation. We work with you to meet your clients’ changing material performance requirements and provide a robust operation that minimizes downtime.

Integrity is at the core of our values as we protect your confidential information. This means the process developed for you is just that, for you and no one else.

We are confident that we can provide the answers you need very quickly, even if your needs aren’t a fit for our capabilities.

We hope you’ll make us your first call and see for yourself what makes Bepex special.

**Greg Kimball, CEO**

5,000 +  
ACCOUNTS ACROSS  
65 COUNTRIES

20,000 +  
SUCCESSFUL  
PILOT SIMULATIONS

30 +  
TRANSFORMATIONS AVAILABLE  
FOR DEVELOPMENT

< 3  
WEEKS FROM EVALUATION TO  
SYSTEM RECOMMENDATION

125  
YEARS AT WORK

1  
CALL IS ALL IT TAKES

# MORE THAN MEETS THE EYE

## Who we’re not.

We are not a catalog. We are not an engineering firm. We are not rigid. We are not too big, nor too small. We are not hard to work with. We are not cookie cutters. We don’t copy and paste. We don’t walk away. We don’t waste time.

## So, who is Bepex ?


We are the Material Transformation People™. We deliver custom-configured processes and systems that make your innovative products possible. We do so quicker than anyone else while offering the most precisely matched technology for your application.

## What we value.

We value integrity, first and foremost. Our customers rely on us to develop custom solutions for their product needs. It is our job not only to develop a custom process, but to make sure that it remains custom for you.

We value innovation, never passing up an opportunity to explore and broaden our knowledge. Every new application, technology, material, and development provides growth, further positioning us as experts in material transformation.

We value commitment. The type of commitment that doesn't disappear in adversity. And we know our customers do too. We built our legacy on remaining committed to the success of our customers, even when it wasn’t easy.



# Why our customers stay with us

## ***We Are The Material Transformation People™***

We deliver custom-configured processes and systems that make your innovative products possible. We have the capability, agility, and flexibility to develop a complete solution for you.

## ***One Call Promise***

Our top customers rely on us to provide results in one call. That's why we are often referred to as their "first call" when developing a new product. Imagine how it feels to be one call away from the answers you need.

## ***Exclusive Range of Technologies***

Our customers don't settle for limited options, force-fitting their new process into one or two technologies. The cost of a misapplied technology can be enormous. Demand the absolute best design for your innovative products.

## ***Big enough to help. Small enough to care.***

We are big enough to supply, support, and be trusted by over 5,000 accounts in 65 countries across the world.

We are small enough to be flexible and responsive, designing our operations to be agile, better serving our customers.




# Trace our Roots

Our foundation stretches as far back as the 19th century. Nearly 125 years of compounding experience, building on each success, translating new ideas and successes to the industries we serve.

Though Bepex as a name has only been around since 1975, we continue to draw on the experience and learnings developed well before our time.


1897

Strong Scott established in Minneapolis, MN




1908

Komarek Greaves established in Chicago, IL




1933

Rietz Manufacturing established in Santa Rosa, CA




1975

Bepex Corporation formed by the merger of Strong Scott, Komarek Greaves, and Rietz




1992

Hosokawa Micron Group purchases Bepex Corporation



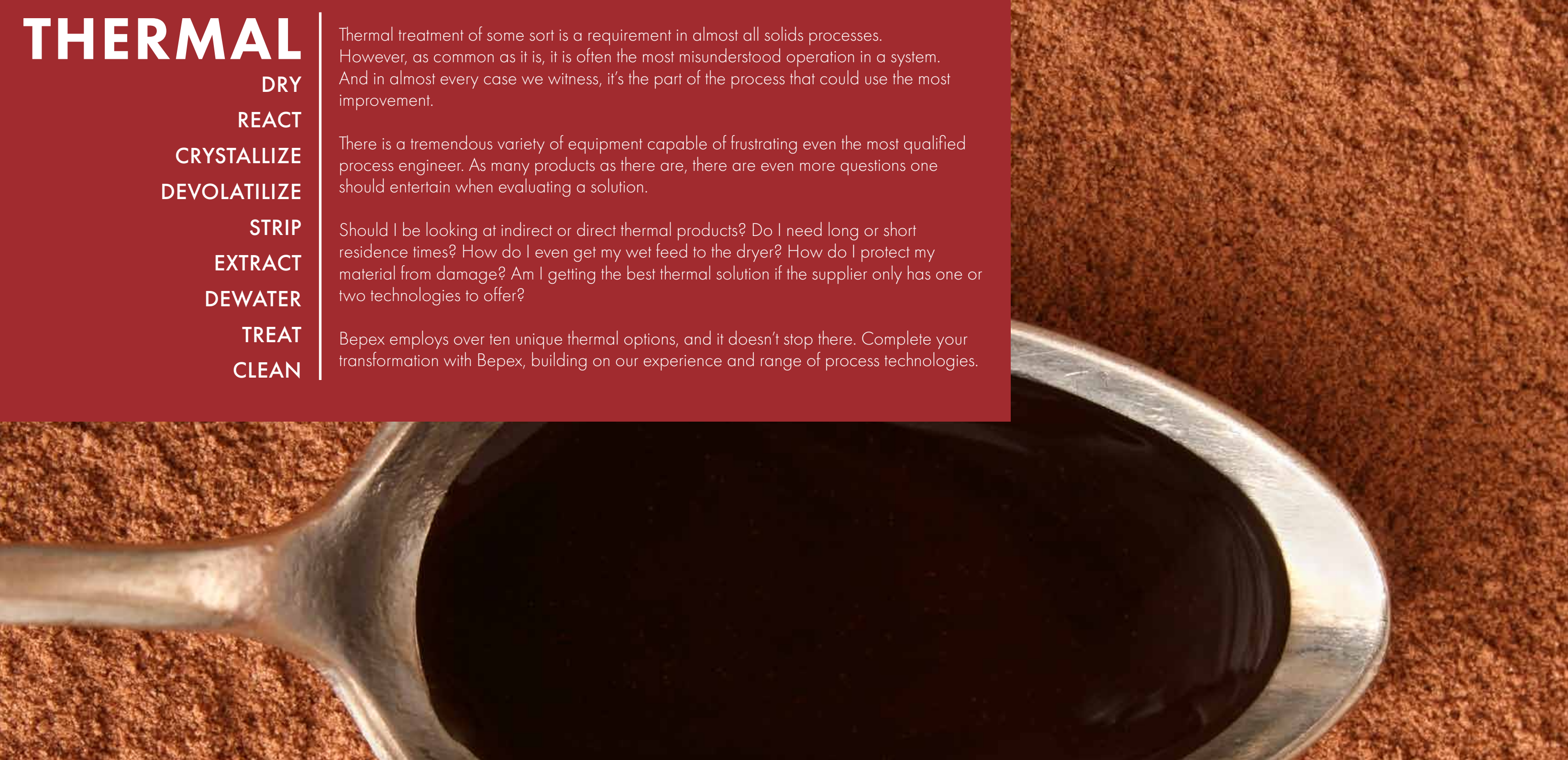
2004

A group of senior managers involved in the day-to-day operation purchases Bepex back from Hosokawa, establishing Bepex International.









- THERMAL**
- DRY**
- REACT**
- CRYSTALLIZE**
- DEVOLATILIZE**
- STRIP**
- EXTRACT**
- DEWATER**
- TREAT**
- CLEAN**

Thermal treatment of some sort is a requirement in almost all solids processes. However, as common as it is, it is often the most misunderstood operation in a system. And in almost every case we witness, it's the part of the process that could use the most improvement.

There is a tremendous variety of equipment capable of frustrating even the most qualified process engineer. As many products as there are, there are even more questions one should entertain when evaluating a solution.

Should I be looking at indirect or direct thermal products? Do I need long or short residence times? How do I even get my wet feed to the dryer? How do I protect my material from damage? Am I getting the best thermal solution if the supplier only has one or two technologies to offer?

Bepex employs over ten unique thermal options, and it doesn't stop there. Complete your transformation with Bepex, building on our experience and range of process technologies.

## MAKE IT **DRY**

Whether your feed is high or low moisture, free-flowing or tough to handle, Bepex will provide the most appropriate drying solution. We balance product quality, process efficiency, safety, and business requirements. Over 10 unique drying technologies designed for you to get the most out of your operation.

## MAKE IT **REACT**

Reaction processes require strict control of residence time, ambient conditions, shear, and material temperatures. Often the output is in a difficult to handle form and requires further processing such as drying, cooling, delumping, or converting into a stable granule.

## MAKE IT **SAFE**

Thermal treatment of solids can, by nature, be a dangerous operation. Drying organic solids poses a risk of fire and potential explosion. Evaporating volatile organic components imposes challenges from operator safety to environmental considerations. Rely on an expert that has continued to deliver safe and reliable operations for over 100 years.

## MAKE IT **CLEAN**

Remove and recover impurities from wastewater sludge treatment to tailings processing. Transform your contaminated solids into value-added product, or safely remove hazardous impurities, minimizing your total environmental impact.





**PCX**  
DISPERSION FLASH DRYER

Dry and mill high-moisture solids in a single step, lowering utilities required and emissions produced.



**SOLIDAIRE**  
PADDLE DRYER

Indirect thin-layer paddle dryer for drying, solvent recovery, heat treating, crystallizing, and cooling.



**FLUID BED**  
STATIONARY BED DRYER

Static fluidized bed dryer for gentle drying of agglomerated materials, beads, and small granules.



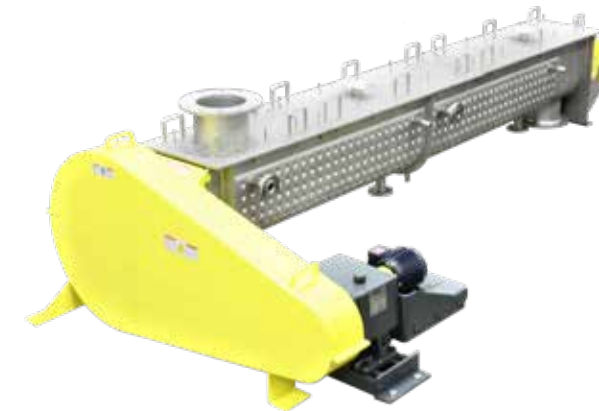
**TORUS DISC**  
INDIRECT DISC DRYER

Indirect disc dryer for long-residence time drying, reacting, crystallizing, and solvent recovery.



**CONTINUATOR**  
PRESSURE COOKER

Ribbon or paddle rotor indirect vessel for continuous pressure cooking of meats, broths, and slurries.



**THERMASCREW**  
INDIRECT SCREW DRYER

Indirect thermal screw for gentle heating, drying, roasting, or cooling of friable materials.





## MAKE IT **GRANULAR**

Transform your fine powders into granules of consistent size, shape, density, strength, and solubility. Options for both wet and dry granulation are available for development, along with typical upstream and downstream operations for the preparation and finishing of the newly formed granules.

## MAKE IT **DENSE**

Convert low-density powders into higher-density granules, extrudates, or briquettes. Minimize transportation costs, handling headaches, environmental impact, plant and operational safety, and bulk storage challenges.

## MAKE IT **DUST-FREE**

Is your current process generating too much nuisance dust? Need a final product that is dust-free to improve the end-user experience? Rely on the granulation experts to maximize your yield, and eliminate the nuisance dust created in your process.

## MAKE IT **SOLUBLE**

Produce particles, granules, or extrudates with controlled solubility and dissolution capacity. From instant dispersion drink mixes and pesticides to slow dispersing granules, we can produce the exact transformation you need.



# GROWTH

GRANULATE

DENSIFY

DEDUST

EXTRUDE

BRIQUETTE

BLEND

INSTANTIZE

STRENGTHEN

SOLUBILIZE

Once, fine particles, powders, and dusty environments were the acceptable end result in solids processing operations. Today, however, nuisance powders and dust raises alarm over safety, handling, environmental impact, and lost product quality and value.

Increasingly, processors are turning to agglomeration, or particle enlargement, resulting in a more flowable particle for easier in-process handling, a more uniform distribution of multiple raw material inputs, and the elimination of dust for both processors and end-users.

Through agglomeration, product characteristics such as density, porosity, strength, solubility, size, and shape can be precisely controlled.

Bepex has developed unique expertise in agglomeration process development, utilizing our exclusive range of wet and dry agglomeration technologies. Fine tune your particles with Bepex.

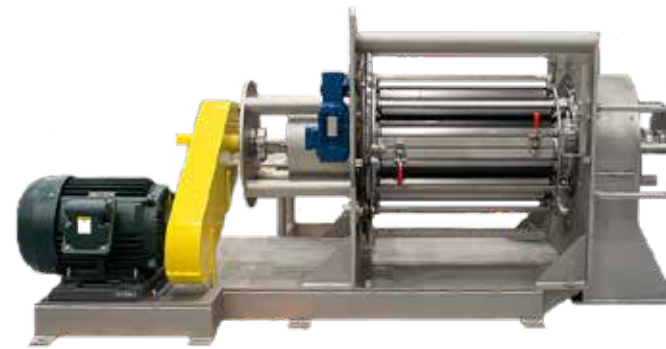




## **TURBULIZER**

### PADDLE MIXER

High-speed continuous mixer for agglomeration, granulation, mixing, and homogenization.



## **FLEXTURBULIZER**

### FLEXWALL PADDLE MIXER

Self-cleaning paddle mixer for consistent agglomeration of cohesive materials into dust-free particles.



## **HYDRAMIX**

### TWIN ROTOR MIXER

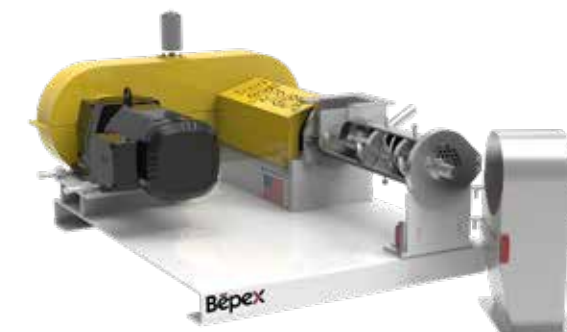
Gentle twin-rotor mixer for low-speed mixing, agglomerating, and liquid-solid reaction processes.



## **TURBOFLEX**

### INSTANT PADDLE MIXER

Vertical paddle mixer with a flexible chamber to produce discrete particles with instant dispersibility.



## **EXTRUD-O-MIX**

### MIXING EXTRUDER

Mix, knead, and extrude multiple raw materials in a single unit operation.



## **ROLL COMPACTOR**

### DUAL-ROLL PRESS

Densify fine powders through high-pressure agglomeration, into dust-free granules, briquettes, and more.





# REDUCTION

MICRONIZE

GRIND

GRANULATE

DELUMP

CHOP

PUREE

HOMOGENIZE

CLASSIFY

SHRED

Particle size reduction is one of the most commonly applied transformations in the solids processing industry. You'd be hard-pressed to find a process engineer, operator, or reliability engineer that doesn't have some experience working with milling suppliers.

There is no more diluted marketplace in our industry than milling equipment providers. Milling is a relatively easy, straightforward process. Apply enough mechanical force, primarily through impact, shear, or compression, and you will sufficiently reduce the size of a particle.

However, while there is a dilution of equipment providers, the opposite is true of the list of providers with wider experience in solids processing. Often there is a lack of understanding of the relationship between particle size reduction and downstream processes.

We have ties to the early days of industrial grain milling in the Mill City itself. We continue to expand on these roots, developing further expertise while designing and integrating size reduction processes worldwide.

## MAKE IT FINE

Consistently grind and classify your bulk solids, producing a narrow particle size with a D50 as low as 3µm. Dynamic internal classification provides efficient particle selection, providing a narrow distribution. Heat the inlet air to simultaneously dry and grind materials in a single step.

## MAKE IT SMALLER

Not looking to mill to a fine powder, but still need to reduce your particle size? Intermediate milling options are available for wet and dry components, capable of producing particles down to 100 mesh.

## MAKE IT HOMOGENEOUS

Delumping processes produce a homogeneous stream of material. Whether eliminating clogging in downstream strainers and nozzles or finishing solids materials before packaging, we will offer a homogenizing process to fit your needs.

## MAKE IT DISSOLVE

Reduce materials to expose surface area making for faster dissolution or melting. Grind large blocks of material to small particles, reducing process bottlenecks, using our low-speed high-torque block grinders.





### RP DISINTEGRATOR SANITARY HAMMER MILL

Sanitary hammer mill for wet and dry coarse grinding, delumping, pureeing, and granulating.



### RD DISINTEGRATOR HEAVY-DUTY HAMMER MILL

Heavy-duty hammer mill offering simultaneous milling and separation of difficult to grind materials.



### RI DISINTEGRATOR INLINE DELUMPING MILL

Inline hammer mill for piped installations, for delumping and grinding particles in suspension.



### RE EXTRACTOR SANITARY BLOCK GRINDER

Low-speed high-torque grinder for reducing large materials, such as cheese, frozen meat, and produce.



### GRANULATOR HORIZONTAL MILL

Horizontal granulating mill designed for precise particle size production boosting yield.



### PULVOCRON AIR CLASSIFYING MILL

High-speed air-classifying mill for controlled fine grinding to a powder.







## SERVICE AND SUPPORT FOR A LIFETIME



### Process Development & Design

We are the Material Transformation People™. No other company has the experience, technical range, or ability to provide a process developed precisely for you.



### Feasibility Evaluation

Our customers call on us first when developing a new product because they get a quick, trusted evaluation, providing early analysis of project feasibility and economics.



### Custom Toll Processing

Bridge the gap between capital purchase and commissioning by relying on Bepex to manufacture your high-value products. Get a head start in capturing market share.



### Process Development Center

Our 25K FT<sup>2</sup> center allows us to simulate complete process systems. Custom-configured systems are our standard, not isolated stand-alone testing units.



### Commissioning

On-site support during process commissioning and start-up. We don't leave until the job is done and you are producing quality product.



### Material Analysis

We've been around a long time. Chances are we've seen a material similar to yours in one form or another. Have us take a look and provide feedback.



### Aftermarket Support

Upsets happen. Parts wear. Foreign material gets into your process. We understand. Our aftermarket group is only one call away from getting you the help you need when you need it.



### Controls and Automation

No team realizes its potential without a strategy. Much the same, your equipment doesn't meet its full potential without the proper controls system in place helping tie everything together.



### Field Service

You take mechanical reliability seriously. We do too. Our field service team is factory trained and ready to get your most vital components back into production.



### Process Optimization

Changing material properties? New product formulations? Subtle environmental shifts altering your production? Let us take a look with you and offer our advice.



### Project Leadership

Keeping projects on track means we can deliver on our promise of getting you to market faster. Our project team has the experience to predict and avert potential issues.



### Preventative Maintenance Plans

Avoid upsets. Consistently maintain product quality. Minimize unexpected costs due to malfunction. Our parts and field service team work together to provide a plan specifically for your system.



## Feed the World More Sustainably

Whether innovating around alternative sources of key nutrients, or focusing efforts on reducing energy – especially in drying – Bepex has pioneered new processing technologies to reduce the use of water, cut energy utilization, and produce lower emissions compared to traditional drying technologies.



## Reduce Energy Intensity

While working to produce fuels from sustainable materials, Bepex engineers are also helping companies develop alternative forms of energy with lower carbon footprints -- especially in the automotive space. Bepex development efforts include cutting-edge work on lithium and graphite production for batteries – along with addressing the looming challenge of battery recycling to recover raw materials.



## Enable Fuller Material Valorization

The opportunities for valorization seem endless. We help cat litter manufacturers capture waste dust and reprocess it into finished products. We help brewers transform waste yeast into high protein ingredients for food and animal feed. And we continue to innovate; working to transform the leaves, stalks and cobs left in the field after harvesting corn into sustainable fuels to replace everything from coal used in energy production to aviation fuel used in jet airliners.



## Expand Feedstock Innovation

From transforming old-school starch into cutting edge adhesives to modifying plant-based thermoplastics to exact processing specifications, we help our customers thrive in a world where feedstocks constantly evolve and new processing challenges constantly emerge. We work together to produce products that are biodegradable, renewable, recyclable or just plain better.





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