



ADVANCED MATERIALS

**PROCESSING EQUIPMENT
FOR SUSTAINABLE SOLUTIONS.**

FrymaKoruma Stephan Terlet

E-MOBILITY BIOFUELS PACKAGING SHIPPING CARBON CAPTURE

PROGRESSIVE PROCESSING SOLUTIONS FOR ADVANCED MATERIALS.

Advanced materials hold great innovation potential in various fields – from renewable energies, e-mobility to digitalization and health care. Due to their complexity, diverse applications, and high safety standards, the production of these materials demands high-performance equipment.

In today's quickly developing markets, ProXES is an experienced, yet agile processing partner, eager to create new solutions in close cooperation with future-oriented customers.

PROVEN TECHNOLOGY FOSTERING INNOVATION

We use highly controlled vacuum processing units to provide large powder induction capabilities. Together with a high-shear homogenizer, our systems help eliminate fisheyes and deagglomerate your powders to produce uniform products.

PRODUCT QUALITY UNDER CONSTANT CONTROL

To achieve the best product, a range of parameters must be tightly controlled – from mixing speed, mixing time, raw material feed rates, viscosity, to temperature and pressure. Our integrated vacuum system removes all micronised air, resulting in a shiny, high-density, superior finished product. The process itself is easy, secure, scalable, and repeatable – thanks to intuitive automation features as seen in our Dinex.

MANY OPTIONS FOR PARTICLE SIZE REDUCTION

Final particle size is a major consideration when manufacturing any advanced material. To assist with

JUST ONE EXAMPLE: DIRECT AIR CAPTURE

Solid-liquid suspensions like slurries are used in many applications aiming at CO₂ reduction, e.g. in the production of lithium-ion batteries, biofuels or sustainable packaging. They also play a major role in diverse carbon capture technologies. While Carbon Capture, Utilization and Storage (CCUS) captures CO₂ from point sources like power generation or industrial facilities, Direct Carbon Capture goes a step further. Here, "negative emission" is the keyword: CO₂ is removed directly from the atmosphere. ProXES supports these new technologies with advanced milling, dispersion and de-aeration systems.


this, we offer a full line of milling equipment to provide particle reduction of solids from 2-3 mm to below 1 µm (or anything in between). Particle size distribution is extremely narrow, while the process is completely temperature-controlled.

REDUCING WATER AND ENERGY CONSUMPTION


In addition to backing your climate-smart innovations, ProXES supports your company in finding new ways to optimize your production sustainability, e.g. for processes or engine technology. Just some examples: Our new mechanical seals within a closed circuit reduce water consumption to a minimum, while our IE3 motors with premium efficiency help reduce CO₂ emissions.

FURTHER APPLICATIONS

 **Battery coatings** for e-mobility

 **Fuel-saving paints** for the shipping industry

 **Plant-based packaging**

 **Slurries** for carbon capturing

Let's talk about how our technology can help improve your individual processes!

IMPROVING QUALITY THROUGH DISPERSION AND DEAERATION.

A reliable induction, wetting, mixing and dispersing of powders in liquids with low air volume incorporation has a big impact on the processing cost and final quality of product.

Depending on your application, manufacturing process and product, ProXES equips you with the optimal tools – from all-in-one units to single-purpose building blocks to fit into your process.

DINEX: SCALABLE. COMPACT. FLEXIBLE.

- All-in-one advanced processing system
- Integrated high and low shear mixing
- Heating/cooling
- Highly automated and flexible
- De-aerating
- Fully CIP-able
- From laboratory to production scale 5 l - 10.000 l batches

WHY IS THIS IMPORTANT?

- Rapid feeding of raw materials
- Efficient mixing and homogenous batches
- Extremely short batch times
- Reduced floor space
- Fewer operators required
- Increased plant production
- Rapid batch changeovers
- Easy scale-up



Dinex
High shear vacuum processing unit

DIL: INDUCTION. WETTING. POWDER DISPERSION.

- Deagglomeration, powder dispersion and high shear mixing
- Powder induction rate up to 5400 kg/h*
- Flowrate up to 45.000 l/h (based on water)
- Faster direct powder induction without vacuum pump*
- Direct powder introduction from bags or silo*
- Adjustable shear rate and number of passes in recirculation setup
- Ergonomic operation*
- CIP/SIP capable

WHY IS THIS IMPORTANT?

- Shorter processing time
- Immediate and complete wetting & dispersion with one machine
- Higher dispersion quality without agglomerates
- Scalable



DIL
Inline high-shear mixer

VACUUM DEAERATOR: CONTINUOUS AUTOMATIC AIR REMOVAL.

- Dynamic rotating disc to create thin film of product
- Integrated vacuum system to remove entrapped air
- Integrated discharge pump
- Less than 1% residual gas
- Continuous production up to 8,000 gallons/h, based on water at 70°F

WHY IS THIS IMPORTANT?

- Reduce or eliminate oxidation
- Reduce common issues with coatings
- Improved product characteristics
- More accurate fill weights
- Reduced unwanted air to spray nozzles



Vacuum Deaerator (VE)
Continuous automatic removal of air

EXPERT MILLS FOR PARTICLE SIZE REDUCTION.

Our portfolio offers different technologies for milling, which individually or in combination create custom particles sizes from 2-3 millimeters, down to sub-micron size (<1 µm).

COBALL MILL: HIGH PERFORMANCE. VERY FINE GRINDING.

- Fine grinding of suspended solids
- Particle size below 1µm achievable
- Extremely narrow grinding area
- Fully temperature-controlled
- Fully CIP-able
- Continuous production

WHY IS THIS IMPORTANT?

- Narrow particle size distribution
- Reduced flocculation in coatings
- Better film appearance
- Reduced nozzle clogging when spraying
- Better adhesion to substrate
- Lowest product losses
- Easy cleaning for rapid product changeovers
- Handling of temperature sensitive components



Co-Ball Mill – MS
High energy grinding & dispersing

A RANGE OF MILLS FOR ALL PARTICLE SIZES



**Disc Mill
MD**



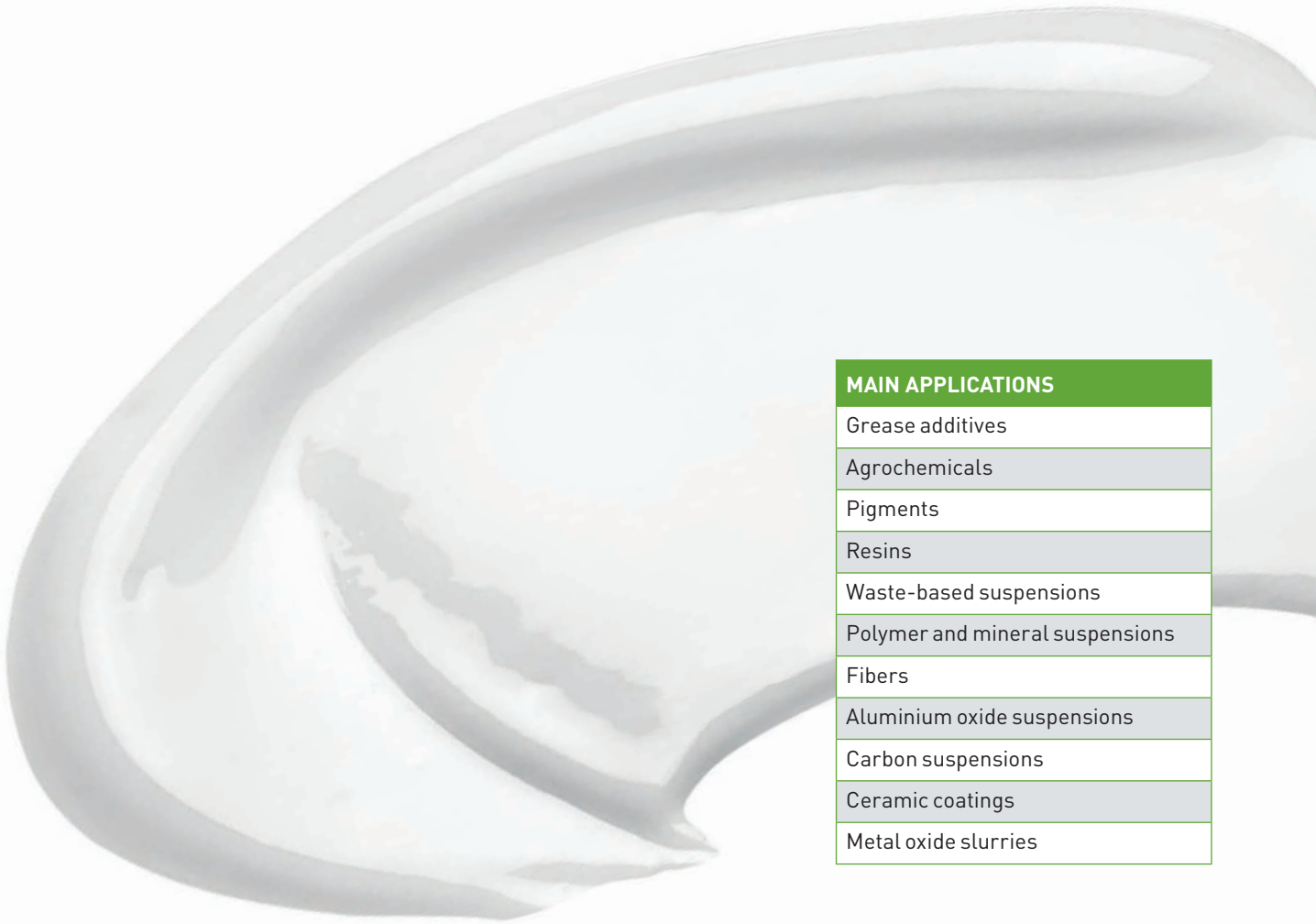
**Colloid Mill
MZ**



**Corundum Stone Mill
MK**



**CoBall Mill
MS**



MAIN APPLICATIONS
Grease additives
Agrochemicals
Pigments
Resins
Waste-based suspensions
Polymer and mineral suspensions
Fibers
Aluminium oxide suspensions
Carbon suspensions
Ceramic coatings
Metal oxide slurries

CORUNDUM STONE MILL: EFFICIENT. RELIABLE. VERSATILE.

- Achieve particle size below 40µm in one pass
- Fully adjustable grinding gap
- Gravity and pump feed available
- Continuous production

WHY IS THIS IMPORTANT?

- Efficient particle size reduction
- Product deagglomeration
- Adjust fineness “on the fly”
- Integrated feeding system
- Wet milling of liquid, viscous and pasty products



Corundum Stone Mill – MK
Versatile wet milling & dispersing



1 ProXES Headquarters, Germany
info@proxes.com

1 Stephan Machinery GmbH
info@stephan-machinery.com

2 FrymaKoruma AG
info@frymakoruma.com

3 ProXES Technology GmbH
info.prt@proxes.com

4 ProXES Benelux, Belgium
info.benelux@proxes.com

**5 ProXES Benelux B.V.,
The Netherlands**
info.benelux@proxes.com

6 ProXES France SARL
info.fr@proxes.com

7 ProXES Polska Sp. z o.o.
info.pl@proxes.com

8 ProXES UK & Ireland Ltd.
ukireland@proxes.com

9 ProXES Inc. IL
salesnorthamerica@proxes.com

10 ProXES Inc. NJ
salesnorthamerica@proxes.com

**11 ProXES (Shanghai) Machinery
Co. Ltd.**
info.cn@proxes.com

12 ProXES Asia Pacific Pte Ltd.
info.sg@proxes.com

EXCELLENCE IS A TEAM EFFORT

With three leading brands FrymaKoruma, Stephan and Terlet under one roof, ProXES combines long-standing expertise with a challenger mindset. As an agile partner, we support our customers from first product concept to the implementation of a successful production process.

At ProXES, we believe in the power of co-creation: We're here to listen, learn and advise. In close collaboration with our customers, we merge their ideas and our technologies into innovative processes and tailor-made solutions that help them align the quality, energy efficiency and profit of their production.

With standalone machines, modern process lines, advanced automation and service concepts, ProXES drives the business of customers in the food, pharmaceutical, cosmetics and advanced materials industries. What about you? Let's create value together – sustainably!

FROM INSPIRATION TO FEASIBILITY

Our process technology and training centre is a space to try out new ideas. Here you can develop or improve formulas in a professionally equipped laboratory, test any kind of machine, perform scale-ups and produce test batches. You will receive expert advice and support on all the capabilities of the technical equipment and modifications.

GET IN TOUCH WITH OUR EXPERTS



For a full list of our global subsidiaries and their contact details, please visit:
www.proxes.com

Headquarters
ProXES GmbH
Stephanplatz 2, 31789 Hameln
Germany

T. +49 5151 583-0
E. info@proxes.com

Follow us on:

