

# Nano and Micro Wet Grinding.

Turnkey Systems for the Pharmaceutical and  
Cosmetics Industries.



KRIEGER



**BÜHLER**



## Turnkey Systems with Cleaning and Sterilisation in Place.

### About Krieger

Krieger represents over 50 years of experience and know-how in the field of liquids and semi-solids processing. Our technology has made its way into many complete mixing and homogenising systems built to meet both individual customer requirements and the latest industry standards.

Krieger's aim is to provide solutions resulting in state of the art mixing and homogenising systems. We therefore continuously improve our machines technically, thus guaranteeing top quality and high standard machines. Krieger has been very successful in designing special equipment for major pharmaceutical and cosmetics companies. The result of the Krieger know-how in providing integrated Cleaning and Sterilisation in place systems is turn key equipment that adheres to the most stringent GMP regulations of those industries.

### Krieger – Buhler Technology Cooperation

Demands from the industry for complete turnkey systems with cleaning and sterilisation in place (CIP/SIP) for the production of pastes in batches with a high powder quantity that are exactly reproducible each time again, with the exact same characteristics, determined viscosity and a given particle size, have led to a technology cooperation between Buhler and Krieger, two globally playing market leaders.

### About Buhler

The Buhler Grinding & Dispersion Technologies business unit supplies advanced process technology, plants, and equipment wherever wet grinding and dispersing processes are of central importance.

Especially in the printing inks and coatings business Buhler is a market leading supplier since more than nine decades. We are very proud of this widely acknowledged position. Our range of products goes far beyond pure machines and system components. Today, we offer total solutions, from process technology to turnkey production plants.

Our product portfolio includes fully automatic three-roll mills, batch and continuous mixing systems, bead mills for all applications, and peripheral infrastructure systems such as pneumatic conveying systems for moving hard-to-handle dry solids.

### Fields of Applications

- Cosmetics
- Pharmaceuticals
- Chemicals





## Wet Grinding Technology. New potentials for your Product Innovation.


Leading players in the pharmaceutical and cosmetics industry are discovering micro wet grinding. This technology is gaining growing attention by both pharma and cosmetics specialists by offering advantages such as:

- Improved yield of precious pigments or other products
- Sophisticated material effects and properties
- Shorter production time

### **Customised nanoparticle dispersions**

In the markets of the Grinding & Dispersion business unit, a trend can be observed towards the application of increasingly small particles. This has led the Buhler Group in a natural manner to the field of nanotechnology. Buhler PARTEC GmbH offers solutions enabling customers to obtain the required effects of nanoparticles in their products on the basis of chemical modification. Buhler PARTEC GmbH, an autonomous company, is dedicated exclusively to the production of nanoparticle suspensions.

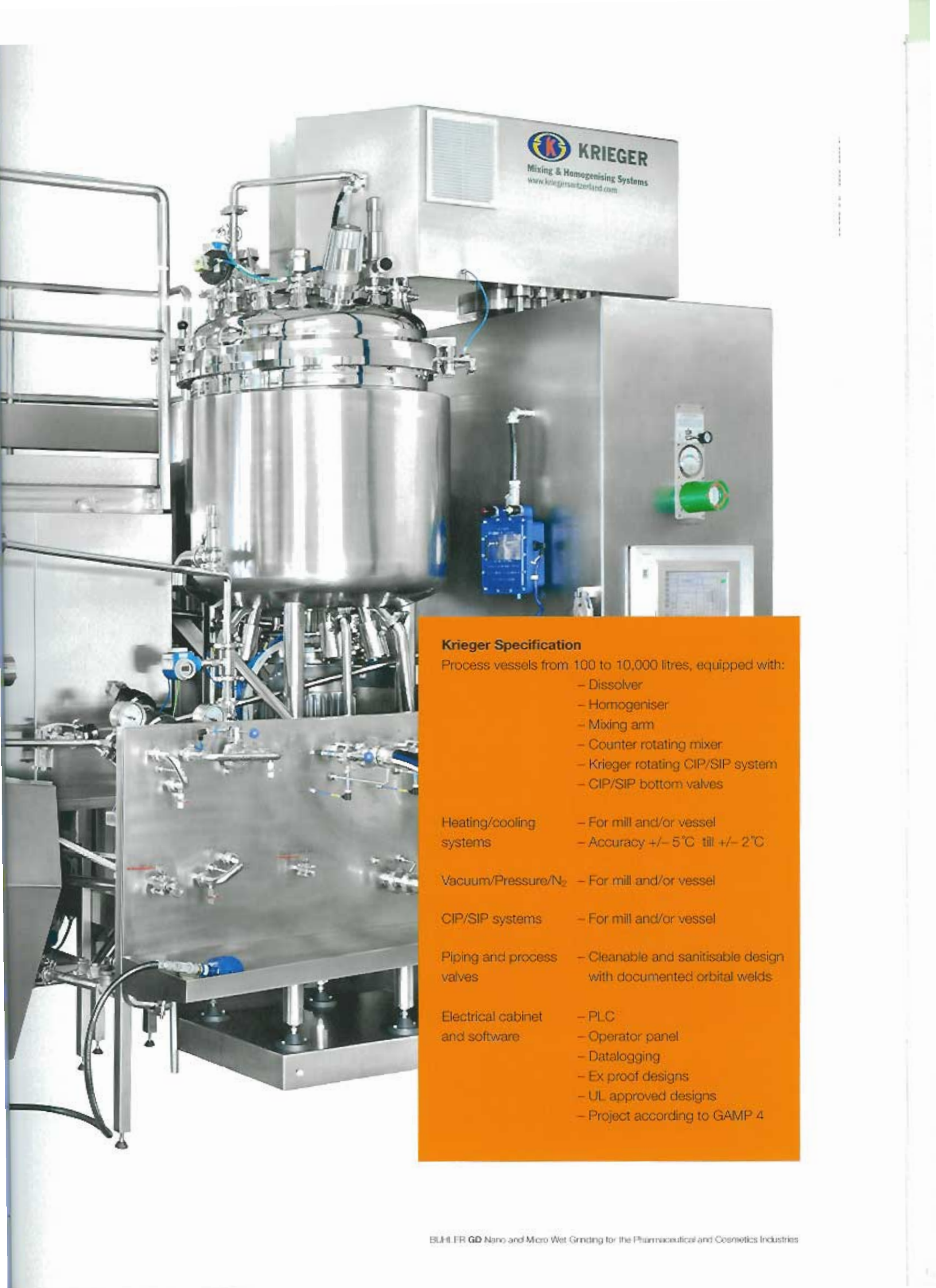




### Buhler Specification

The Buhler K60 conical bead mill, stainless steel edition, offers the following advantages:

- |  |   |
|--|---|
| Premium quality properties               | – Particle size reduction down to the nanometre range<br>– Narrow particle size distribution          |
| Wear resistant materials                 | – Stainless steel<br>– Ceramics   |
| Easy to clean                            | – Cleaning friendly design<br>– Small grinding chamber  |
| High throughput without clogging         | – Slot separator<br>– Conical grinding chamber  |
| Ideal for temperature sensitive products | – Unique temperature control due to sophisticated cooling system<br>– Favourable surface/volume ratio |
| Large viscosity range                    | – 500...120,000 cps, measured at ambient temperature and a shear ratio of $10 \text{ s}^{-1}$         |



#### Krieger Specification

Process vessels from 100 to 10,000 litres, equipped with:

- Dissolver
- Homogeniser
- Mixing arm
- Counter rotating mixer
- Krieger rotating CIP/SIP system
- CIP/SIP bottom valves

Heating/cooling systems – For mill and/or vessel  
– Accuracy +/- 5°C till +/- 2°C

Vacuum/Pressure/N<sub>2</sub> – For mill and/or vessel

CIP/SIP systems – For mill and/or vessel

Piping and process valves – Cleanable and sanitisable design  
with documented orbital welds

Electrical cabinet and software – PLC  
– Operator panel  
– Datalogging  
– Ex proof designs  
– UL approved designs  
– Project according to GAMP 4

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