



PROCESS

# NEUMAN & ESSER

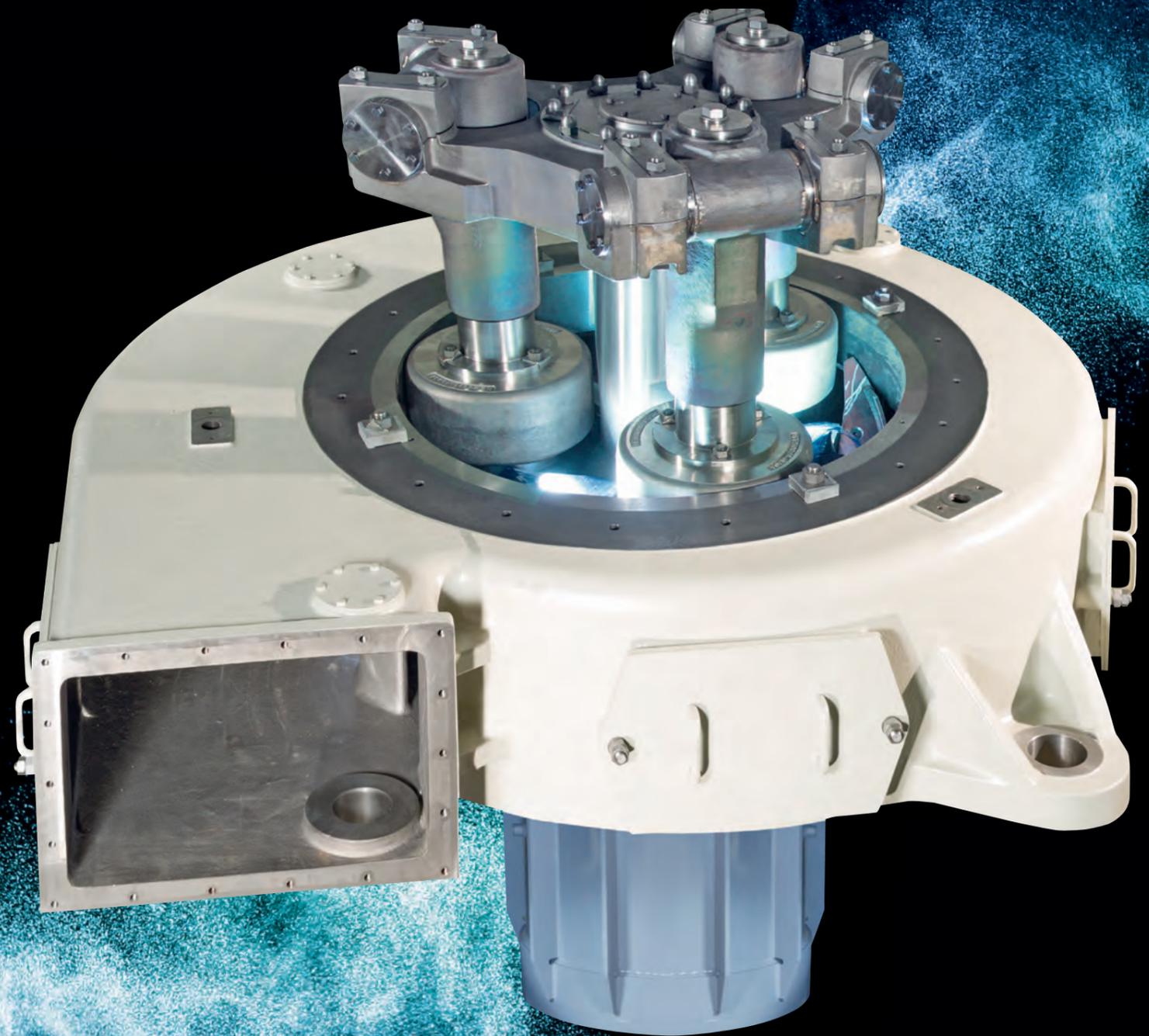
Process Technology

# PENDULUM MILL

Proven grinding concept, robust design and low energy consumption

The Pendulum Mill PM is a roller mill and suitable for fine grinding and drying of soft to medium-hard minerals such as clay, bentonite, barite, phosphate, coal, lime, limestone and talc. Further applications include pigments and a large number of chemical products. The mill consists of a single piece cast, mill housing and a rotor with crosshead and pendulums whose grinding rollers travel at medium speeds on the grinding ring. The centrifugal forces created by this motion are used for crushing the material between the rollers and the ring. Air directed through channels in the mill housing and rotating shovels convey the material from the mill bottom to the grinding zone. Both the coarse and fine particles are then transported out of the

grinding zone to the directly driven classifier. In conjunction with the air flow, the classifier speed and design allow for stepless adjustment of the desired particle size distribution. Coarse product is rejected by the classifier and fed back to the mill for further grinding, whereas the particles with the required final degree of fineness flow through the mill classifier and are separated from the air in a downstream collector. The throughput of the various mill sizes and designs range from 0.5 t/h to 150 t/h (1,100 to 330,000 lbs/hr). With the NEA Pendulum Mill high demands of the particle size distribution up to super-fine grinding can be easily obtained. The achievable particle size ranges from a top size of 10  $\mu\text{m}$  to 1,000  $\mu\text{m}$  (1,250 to 18 mesh).

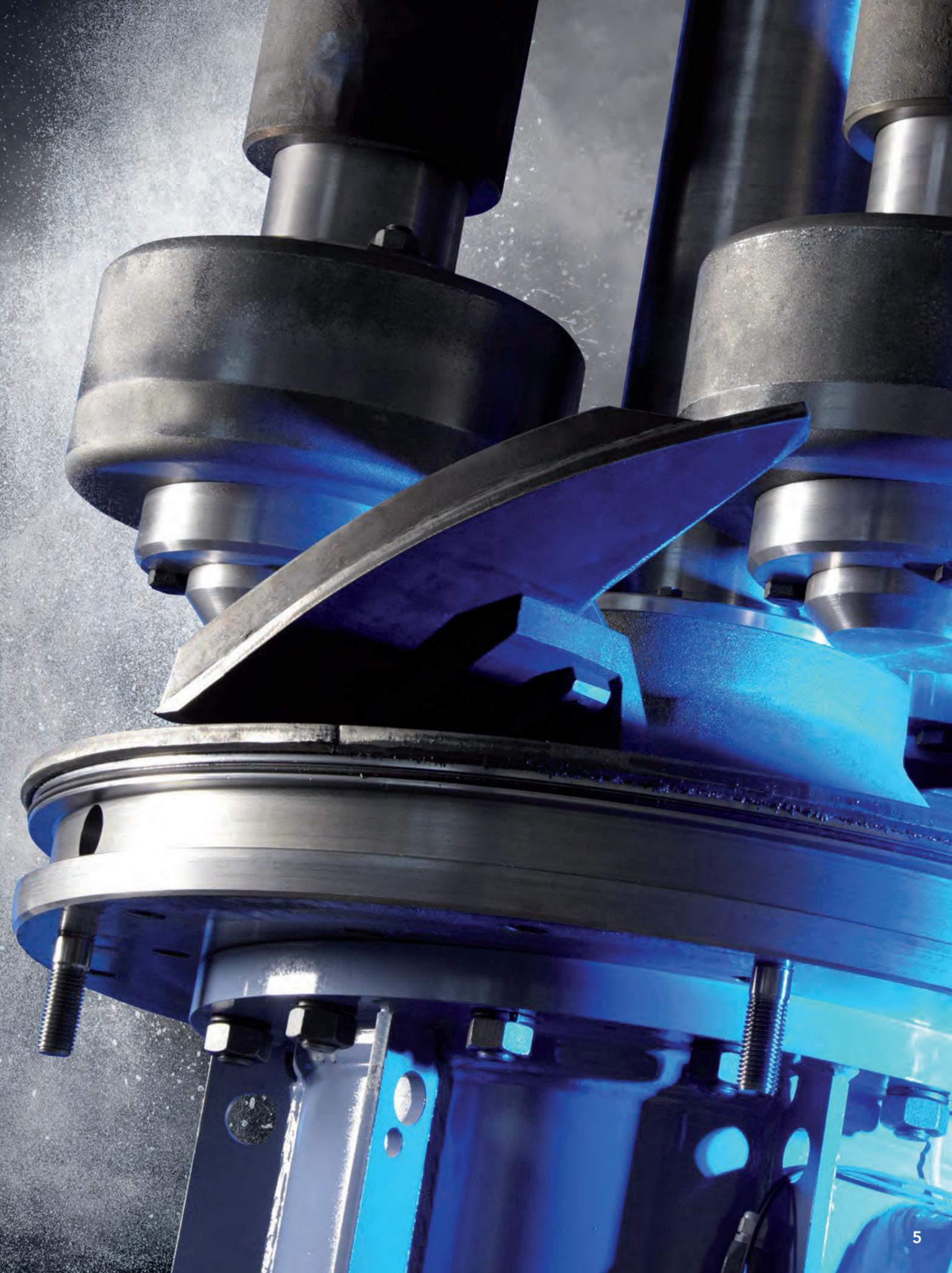


# DIRECT DRIVE

Consistent transfer of a successful concept to the product family

The advantages of the proven Direct Drive technology of the mill rotor and dynamic classifier for the Impact Classifier Mill ICM provided NEUMAN & ESSER perfect reason to consistently transfer this new drive concept to their Pendulum Mill PM. When providing a Direct Drive, the gearbox and oil supply as well as couplings and drive frames are completely eliminated because the mill rotor is driven directly by a VFD controlled motor.

Depending on mill size, the classifier head and the upper mill casing for the Pendulum Mill can be opened automatically using a counterweight mechanism. This allows the speedy exchange of the entire mill rotor in a mere 15 minutes and reduces work in the interior of the mill such as the replacement of wear parts. This work can take place outside the direct production area, improving operation, service safety and accessibility.

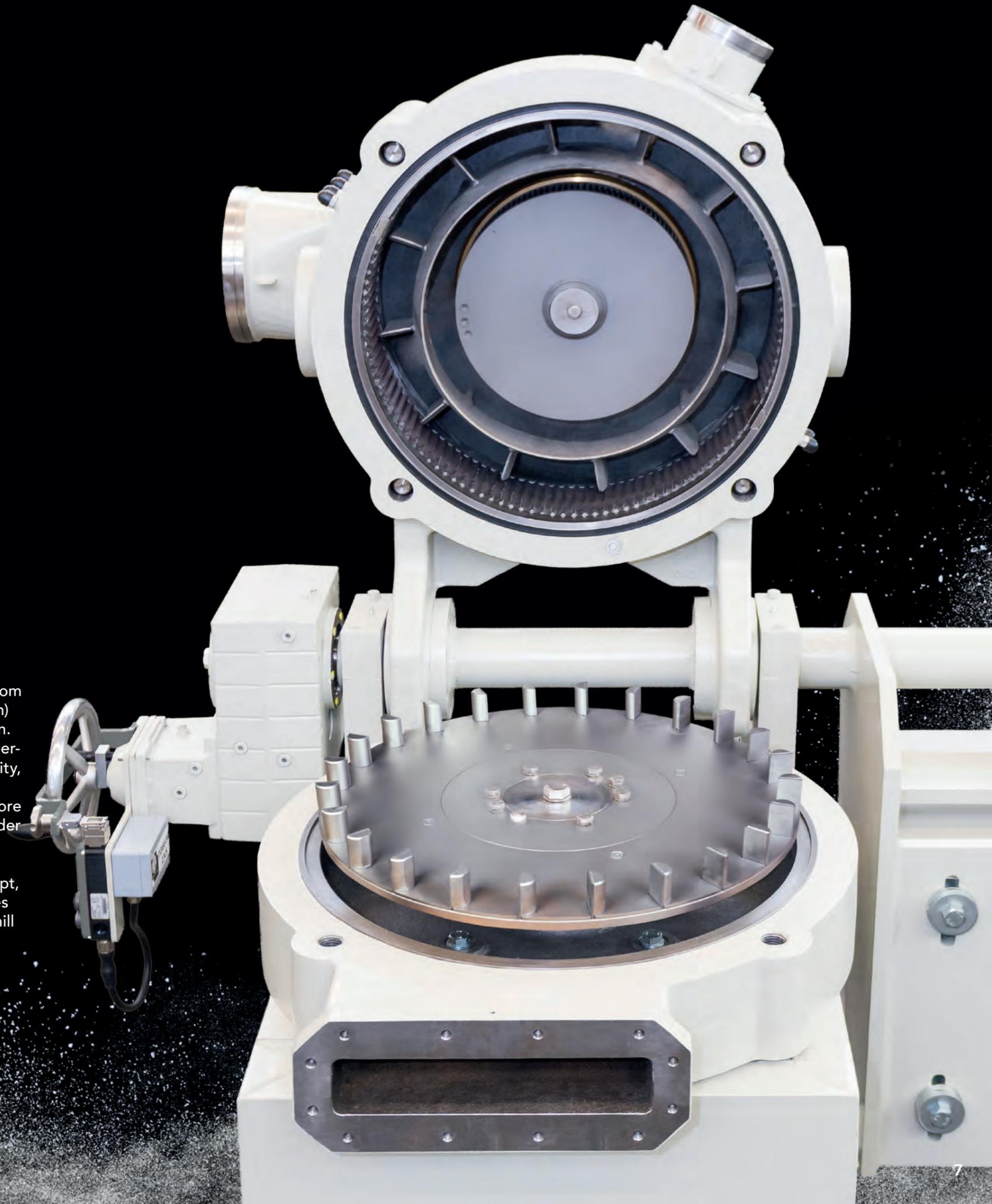


# IMPACT CLASSIFIER MILL

For top requirements regarding sharp top cuts

The Impact Classifier Mill ICM is superbly suited to grind brittle material to extremely fine particles. The ICM combines efficient impact grinding with precise classification in a single component. The grinding tools convey the feed material into the liner at variable speeds where the particle size reduction takes place. The material is then carried via the air flow through the mill to the integrated but independently powered classifier section for separation. Product fineness can be easily adjusted by varying the classifier's rotary speed. Particles which are too coarse are rejected by the classifier and returned to the grinding zone again. The advantages of the ICM are its narrow par-

ticle size distribution with sharp top cuts from 10  $\mu\text{m}$  to 2,000  $\mu\text{m}$  (1,250 mesh to 10 mesh) and extraordinary low fine dust generation. This means that the desired product properties with regards to flowability, color intensity, shine, applicability and taste are achieved. Typical applications for the ICM can therefore be found in the chemicals, pigments, powder coatings, minerals, coal, food, sweets, cosmetics and pharmaceuticals areas. In addition to the proven direct drive concept, available for most sizes, further advantages of the ICM include, above all, the robust mill housing in PSR 11 design as well as easy operation and cleaning.



# HAMMER MILL

Continuous operation, robust design  
and extremely low maintenance

The Hammer Mill HM is suitable for grinding soft to medium-hard material. The high-speed Hammer Mill utilizes the principle of impact grinding. Its core consists of internal, armored housing with exterior dust-proof roller bearing housings which accommodate the rotor shaft and rotor with its wear-resistant hammers.

The material is fed into the Hammer Mill via a dosing airlock. Here, a controller regulates the air lock speed and, therefore, the mass flow of the entering raw material which is dependent on the pressure in the Hammer Mill or the motor's electrical power input.

The material is ground between the rotating hammers and the housing. Parallel to the raw material, a constant flow of air or hot gas generated by a fan enters the Hammer Mill housing and conveys the ground product into the air separator. An unique feature of the Hammer Mill is the ability to reject hard to grind material, extending wear life and improving product quality.

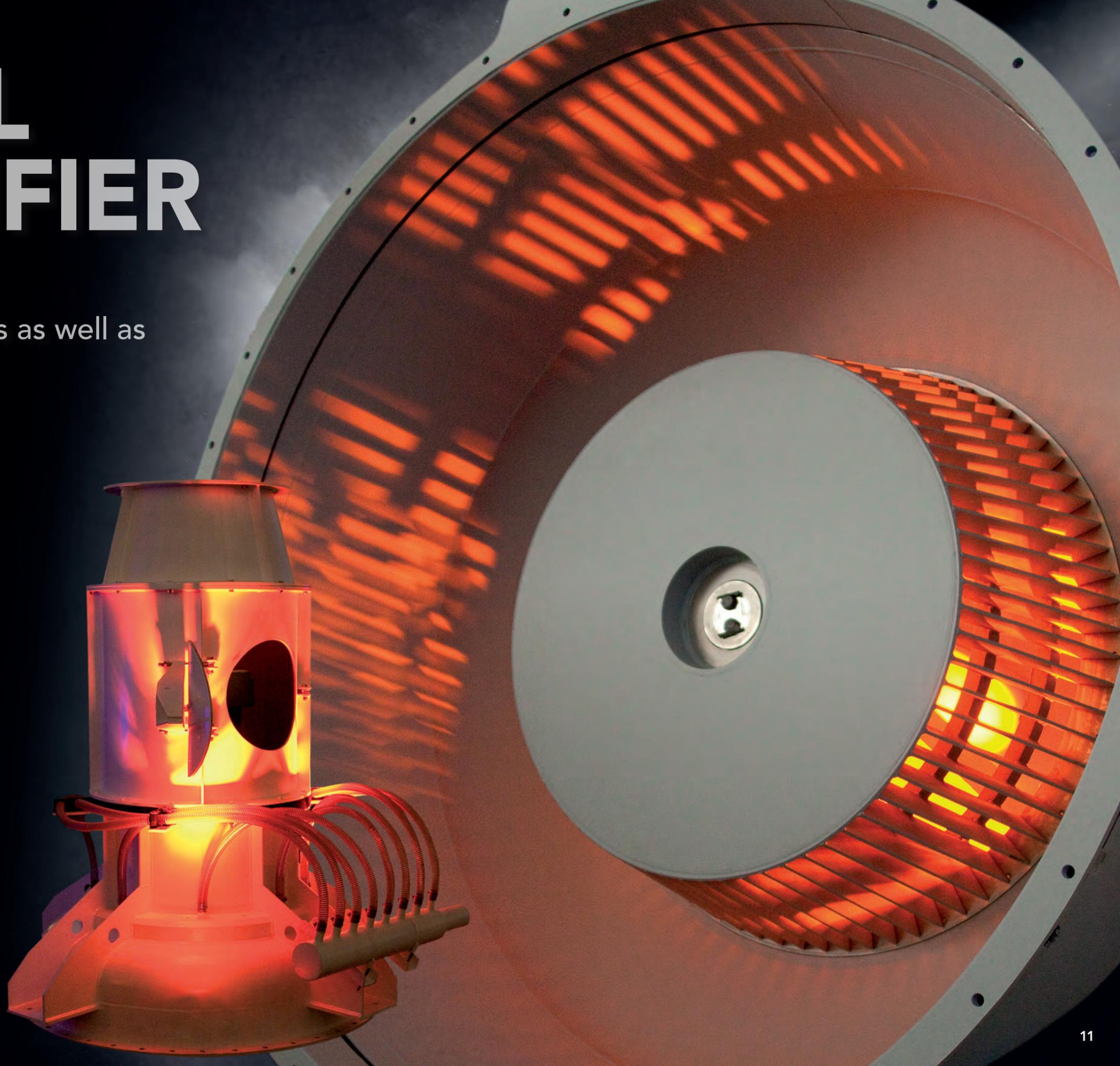


# RADIAL CLASSIFIER

Suitable and effective  
for NEA Pendulum Mills as well as  
other brands

The NEA Radial Classifier CPM was designed for high-precision classification for use with a NEA Pendulum Mill. By changing the classifier's rotational speed and geometry, it is possible to control product fineness and therefore, product quality. Speed adjustments can be easily made with virtually immediate effect. Thus, with the CPM, the maximum particle size of the ground product can be set to be within the range of 10  $\mu\text{m}$  and 500  $\mu\text{m}$ . When combined with impact mills and roller mills, performance improvements of 30% to 80% compared to static separators and 10% to 50% compared to whizzer separators can be achieved.

These improvements reduce specific energy requirements considerably. Numerous retrofits both for NEA Pendulum Mills and for roller mills from other manufacturers as well as of different construction types confirm this in daily practice. The NEA Radial Classifier CPM is equipped with different separator wheel types, depending upon the respective application. Thus, for example, cylindrical separator wheels are used to achieve steep particle size distribution and to minimize the quantity of oversize particles while maintaining minimum pressure loss. The use of newly developed classifier wheels as well as the highly effective NEA air purged classifier gap also enable the use of the NEA Pendulum Mill PM for superfine grinding applications.



# CYCLONE CLASSIFIER

Versatile and easy to convert to Cyclone Collector

The patented NEA Cyclone Classifier CCF Gen. III. enables precise, sharp top cuts in the fineness range between 5  $\mu\text{m}$  to 150  $\mu\text{m}$  (100 mesh). It provides narrow particle size distributions and separates the fine fractions efficiently, e.g. for dedusting. The Cyclone Classifier can, for example, be operated in-line with different mill designs or as a stand alone classifier. It is also suitable for retrofitting existing systems.

The air with ground material enters the top of the cyclone housing via an inlet spiral. Classification is performed by using a classifier wheel positioned inside the cyclone housing.

The fine material travels with the air flow through the rotating wheel while rejected coarse material on the housing wall is transported downwards. The product is dispersed through patented features and secondary adjustable air flow and the fines are conveyed to the classifier wheel again.

The product particle size is easily and precisely controlled by the classifier wheel speed. The classifier seal is air purged reducing wear and preventing large particles passing into the product. The Cyclone Classifier can be supplied as a pressure shock resistant PSR 11 design. It is easy to convert the Cyclone Classifier to a Cyclone Collector. The lift and rotating device allows fast product changes and easy access for cleaning.

Applications for the Cyclone Classifier are varied. It is used for dedusting, separation of impurities or for creating steep particle size distributions.



# CYCLONE FILTER

Optimum separation in the compact round filter, advantageous for all grinding and classifying systems

The NEA Cyclone Filter CF combines the advantages of the Cyclone Collector with those of a cartridge filter. Various construction sizes are available for volume flows up to 150,000 m<sup>3</sup>/h. The cyclone effect separates the major amount of product from the air flow and conveys it directly to the cyclone discharge. Cyclone yields from 90% to 97% are achievable in this initial separation step. The remaining fine particles will be separated from the air flow by the filter cartridges which offer a filtration surface six times larger than filter bags. The number of cartridges can be reduced

by two-thirds compared to bags and still provide double filtration surface for constantly low pressure loss. Compact filter designs provide considerable savings in building height and floor space requirements as well as in required structural steel.

The applications for the Cyclone Filter are varied and include powder coatings, graphite, coke, coal, calcium carbonate, magnesium hydroxide, talc, aluminum hydroxide, gypsum, bentonite, titanium dioxide, phosphate rock, lime and limestone.

# SOLUTION PROVIDER

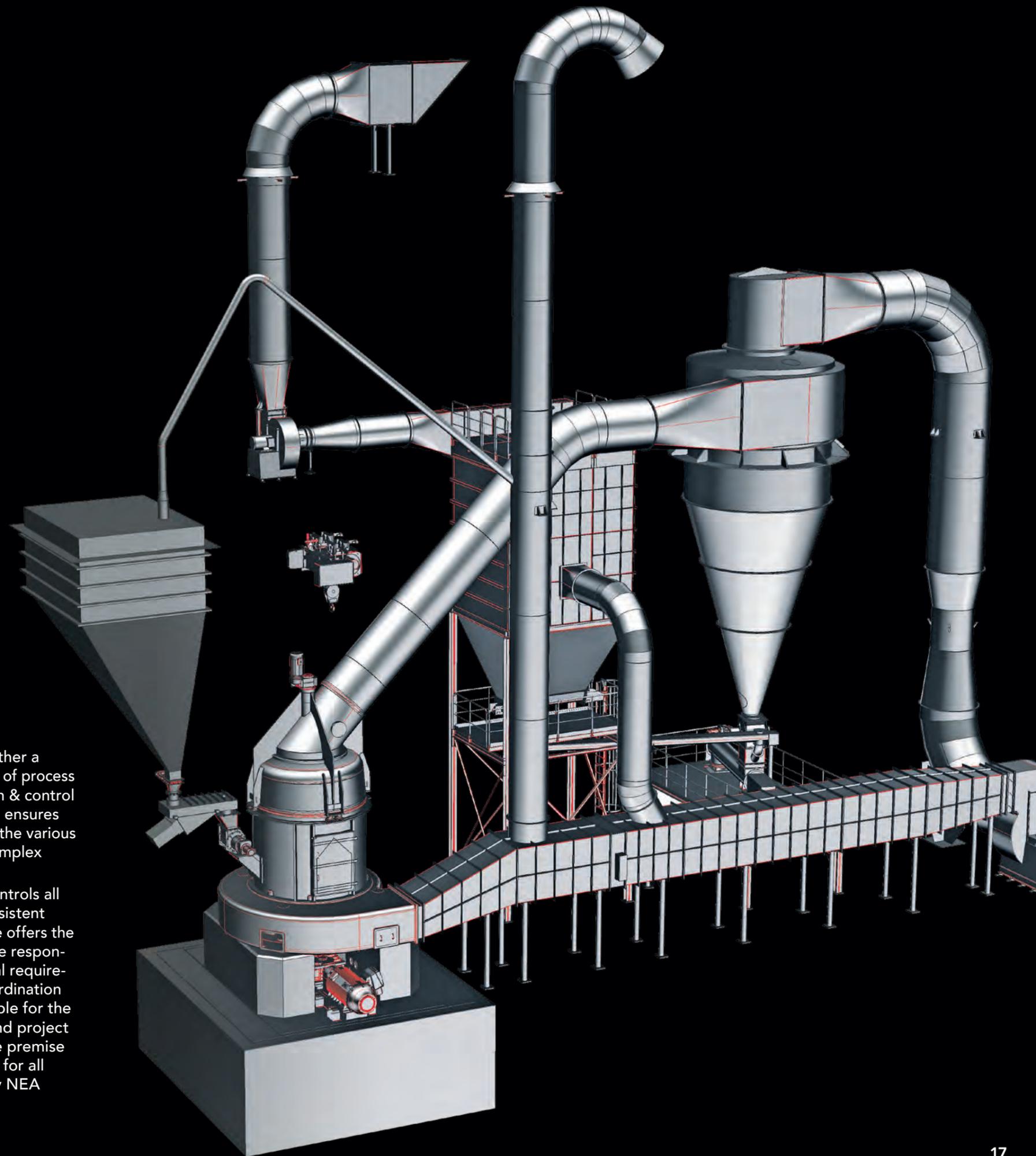
Expert know-how for complex system engineering

In order to meet individual customer requirements, a specialized product portfolio of mills, classifiers, filters and other system components is available. Prior to designing the system, customer-specific grinding and classifying tests are run in order to guarantee the perfectly tailored design of the system. Moreover, new developments in all areas guarantee a state-of-the-art solution for all customer requirements.

NEA system engineering even goes a step further. It already checks in advance whether all the requirements for a grinding and/or classifying system are adequately taken into account in their life cycle. Therefore, ease of installation, operability, serviceability and the sustainable handling of resources belong to the technical design principles and constructional planning for every single system.

NEA Process Technology put together a fitting team of experts for the areas of process technology, design, instrumentation & control as well as CAD for each order. This ensures that sound expert knowledge from the various disciplines is integrated for such complex application tasks.

The nominated project manager controls all interdisciplinary activities. The consistent project-orientated process structure offers the customers the advantage of a single responsible contact person for all technical requirements. In addition to targeted coordination of the activities, he is also responsible for the compliance with quality, budget and project schedule. This guarantees that the premise "Customized Process Technology" for all orders is adhered to, making every NEA system unique.



# TEST CENTER

For scale-up to customer specific production plants

Since 1982 the scale-up and design of the grinding and classifying systems for customers are solidly based on the results of the NEA Mahl- und Sichtsysteme's Test Centers in Germany and lately in Brazil. The systems components can be configured and applied variably for grinding, classification and solid particle separation tests, both in cyclones and/or in filters. The parameters for the individual materials such as particle size distribution, hardness, moisture or density are also determined here.

Substantial extension of the existing facility followed in 2010. In addition to the Pendulum Mill PM 00, a full production size Pendulum Mill PM 05 DD system was installed. This system is characterized in particular by the patented Direct Drive for the Pendulum Mill and the newly developed Cyclone Filter.

Tests can be carried out on the following systems at the Test Center:

- Pendulum Mill PM 00
- Pendulum Mill PM 05
- Impact Classifier Mill ICM 10/12
- Impact Classifier Mill ICM 38/48
- Impact Classifier Mill ICM 48/60
- Hammer Mill HM 00
- Guide Ring Classifier GRC 76
- Cyclone Classifier System CCF 76
- Cyclone Filter Test Stand CF 76

# AFTER SALES SERVICE

A comprehensive service portfolio for life cycle management

NEA Process Technology has a wide-ranging After Sales Service. It is based on expert knowledge as well as decades of experience in the areas of revision, supply of spare and wear parts as well as the modernization of existing systems from NEA and other manufacturers. When assessing a grinding system, the focus is on its economic optimization and longevity. Therefore, solutions to minimize downtimes and repair costs are worked out with the customer in order to guarantee the best possible operational availability. These include the recording of the full machine parameters, project planning for repairs and individual service contracts. Testing of the system components down to the last detail as well as documented performance tests provide information regarding the necessary measures for revision or repair work.

When exchanging spare parts, specific components are removed and, as required, replaced with higher-quality wear materials. A process which is implemented from all international locations using the same know-how. Grinding systems are used over several decades and the milling requirements can change over time. Reasons for this can be improvement of machine efficiency but also changed process parameters. As NEA Process Technology only exchanges those components which are important for the new process, considerable cost savings can be achieved by revamping as opposed to purchasing new equipment and systems. Customized Process Technology, smart and innovative.



# PORTRAIT

Solution provider for multifaceted areas of use

Close to 90 years experience in mechanical process technology and constant dialog with customers form the basis for NEA Process Technology 's high level of performance and quality. The main portfolio incorporates Pendulum Mills, Impact Classifier Mills as well as Cyclone Classifiers, Cyclone Filters and Air Separators for coarse and fine classification. The large, modern NEA Test Centers in Germany and Brazil are used to perform tests with the customers' material in order to properly size the mill and system design for the planned production parameters.

After Sales Service and individual solutions for the modernization and revamp of existing grinding systems round off the performance range. Thus, better product quality and maximum grinding output are achieved by revamping NEA grinding systems as well as mills from other brands.

With the customers' and their markets' individual requirements, NEA Process Technology developed from a mill manufacturer to a Solution Provider, including upstream and downstream system components. Simultaneously, the NEA population within the world market has grown to more than 1,000 grinding and classifying systems. These are not only used in the traditional ceramics, pigment and preparation industries, but also for producing sweets, chemicals and powder coatings.

Therefore, new NEA companies for sales and application were founded in a first step in Brazil and in the USA as well as sales offices in Egypt and China in order to support the local customer base. German core competence with strong research and development, coupled with local engineering and procurement in accordance with local standards and specifications, allow for a high degree of flexibility. This is the best approach to face future global markets while focussing on customer-specific needs.





## NEUMAN & ESSER GROUP

- COMPRESSORS
- SERVICES
- SEALINGS
- PROCESS
- DIGITALS

### Find out more @

[www.neuman-esser.com](http://www.neuman-esser.com)  
[www.neacusa.com](http://www.neacusa.com)  
[www.neac.de](http://www.neac.de)  
[www.stasskol.com](http://www.stasskol.com)  
[www.hofer-highpressure.com](http://www.hofer-highpressure.com)

### Headquarters

Übach-Palenberg, Germany  
Phone: +49 2451 481-01

## NEUMAN & ESSER

### Process Technology

#### Global

NEUMAN & ESSER Process Technology GmbH  
Übach-Palenberg, Germany

#### North America, The Caribbean

NEUMAN & ESSER Process Technology USA, Inc.  
Katy, Texas, USA

#### South and Central America, Cuba

NEUMAN & ESSER Engenharia e Soluções Ltda.  
Belo Horizonte, Brazil

#### China

NEUMAN & ESSER (Beijing) Co., Ltd. (Sales Office)  
Beijing, China

#### Egypt, Libya, Sudan

NEUMAN & ESSER Egypt Ltd. (Sales Office)  
Cairo, Egypt