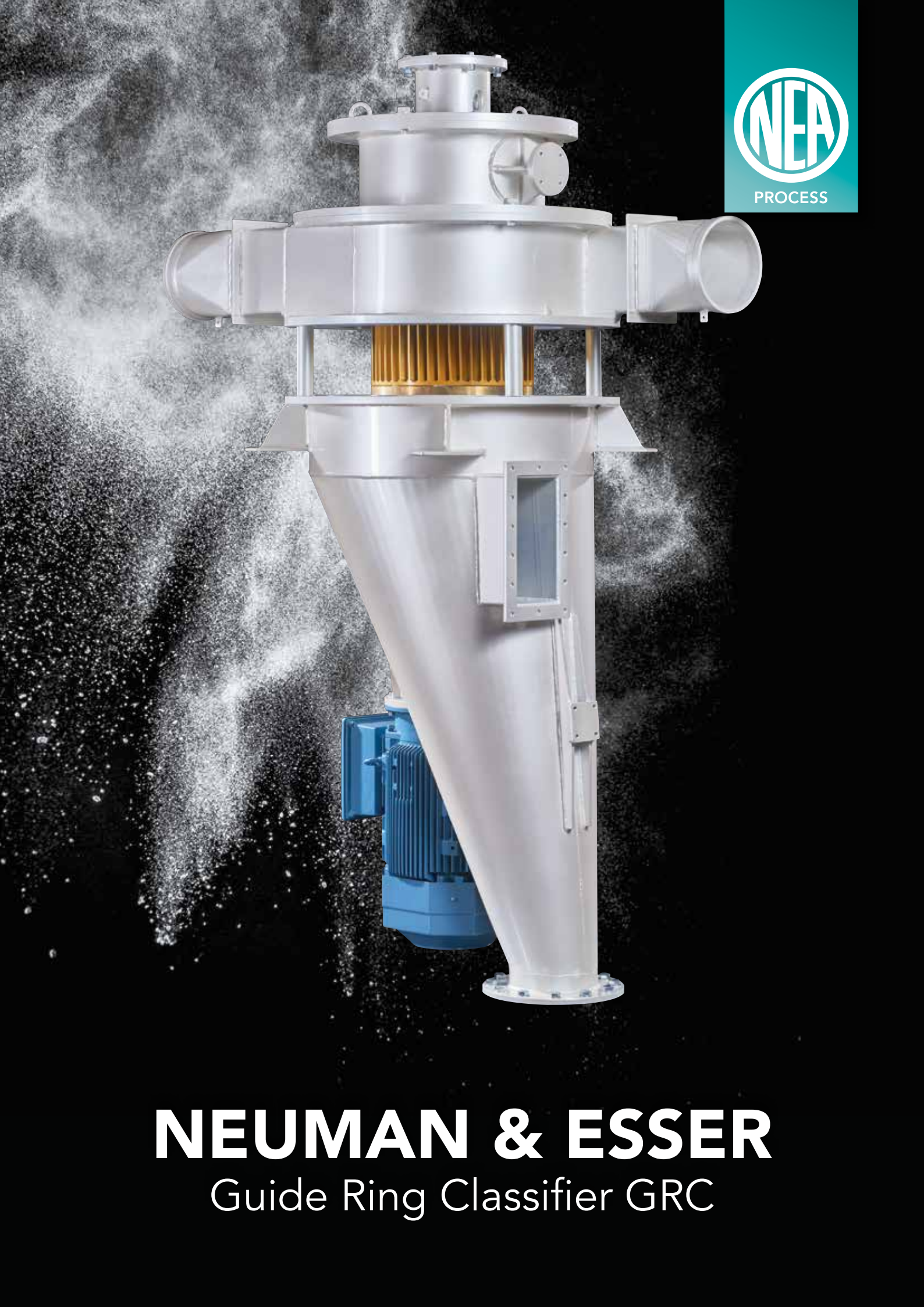


PROCESS

NEUMAN & ESSER

Guide Ring Classifier GRC

CHALLENGE BOUNDARIES

The New GRC Air Classifier Provides Revolutionary Results

Size comparison of fine material and a blood cell.

The particle size distribution of pulverized material is a decisive factor for the properties. When manufacturing the materials, a precisely defined particle size distribution is achieved by grinding and subsequent separation, the so-called classification.

This classification step of the particles is a general requirement after grinding in a mill. While it is preferred to integrate the separation process into the mill itself, external air classifiers are commonly being used. Such is the case especially with ball mills.

Classification of solids with GRC

Even prior to grinding, the use of an air classifier can be advantageous. If the feed material for the grinding process already contains a large quantity of desired final product, it makes sense to separate the fine material fraction in advance. Firstly this material no longer burdens the mill and secondly overgrinding of such material is being avoided.

The NEUMAN & ESSER (NEA) air classifier GRC (Guide Ring Classifier) is such an air classifier allowing both types of above mentioned operations.

The initial GRC layout was designed for the classification of roughly 200 µm to 20 µm (1 µm = 0.001 mm) particles.

The air classifier divides the so-called feed material into fine material on one side and coarse material on the other side. The size GRC 820 at the NEUMAN & ESSER Test Center achieves throughputs of several tons per hour for medium fineness. For classification in the higher fineness range, throughput is reduced to several hundred kilograms per hour because the number of particles to classify increases exponentially: if 0.1 mm sized particles are crushed to 0.01 mm, the number of particles increases thousand-fold at the same time.

The feed material is fed into the GRC from the top using a vertical pipe. After falling onto a distribution plate above the classifier wheel the material is thrown to the outer diameter of this plate. There, the material drops into a ring gap between the classifier wheel on the inside and the air guidance ring on the outside.

The inflowing air now carries the particles into the classification zone. Here fine particles are allowed to pass whereas too large particles are being rejected.

After passing the classifier wheel the fines leave the classifier housing directly beneath the classifier heading for the downstream filter where the finished product is being discharged from the system. The rejected fraction drops to the bottom of the housing and leaves it via a discharge airlock.

Multiple improvements provide a revolutionary result

In order to improve the already existing high performance, NEUMAN & ESSER has now made essential improvements to the GRC air classifier. Ideally a perfect classifier allows only a very specific size of particle and below to pass. Since this is technically not feasible on a production scale the range of particle size above and below the target value defines the quality of such a classifier; the so called “cut efficiency”. The smaller the range, the better the classifier.

NEA experts focused on how to intensively separate fine and coarse in the feed material, dispersing as it is called by the experts and on efficiently guiding the material through the GRC classification process. Only if the solids exist as individual particles in the classifying zone, the classifier can effectively remove the desired fraction from the feed material, thus classifying two precisely defined partial quantities.

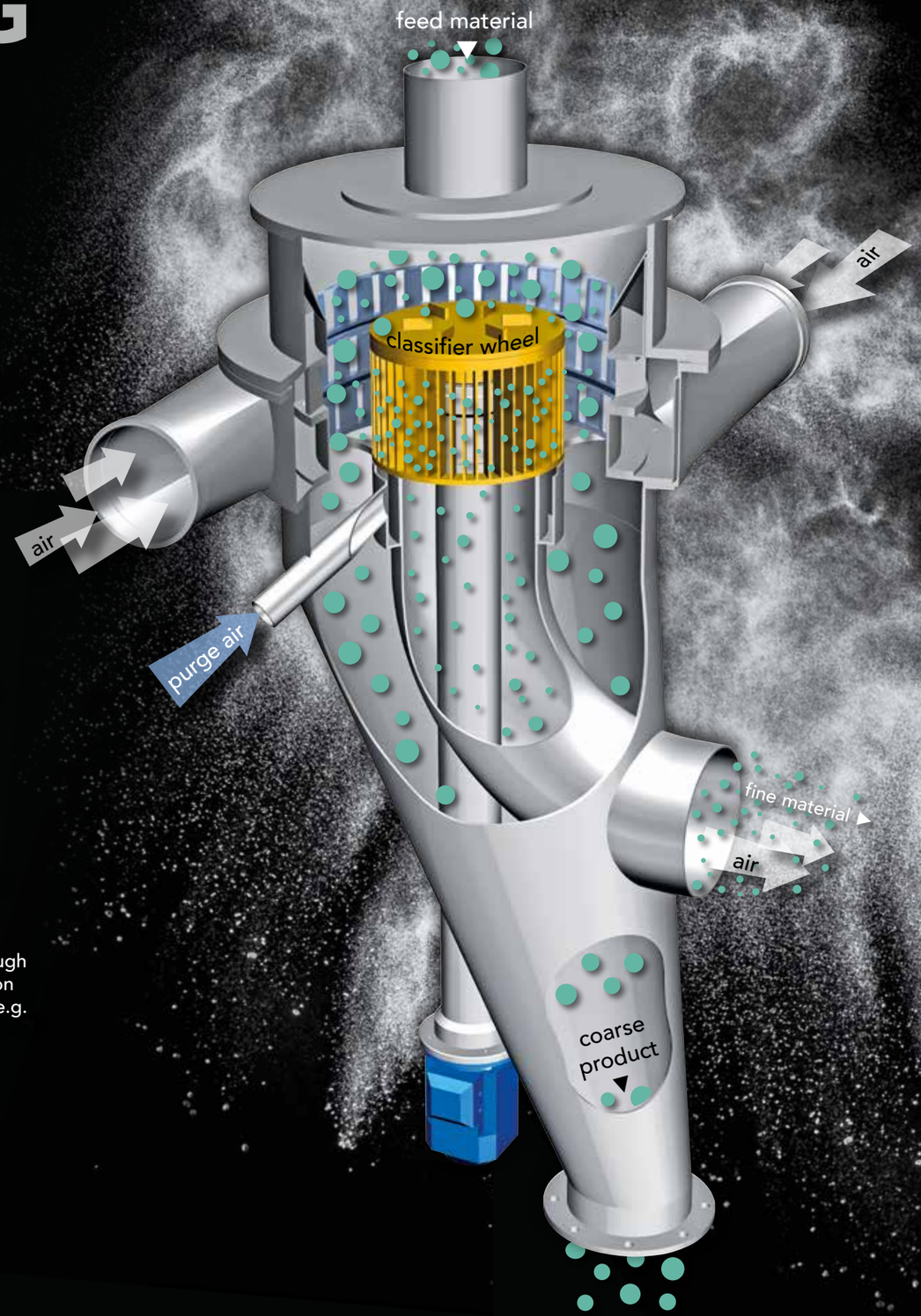
The new GRC design features now a distribution cone in the inlet of the feed material above a significantly redesigned dispersing unit. After sliding down the cone and passing the dispersion zone, the material reaches the known ring gap. In contrast to the former design now a virtuously engineered guide vane ring handles the transportation into the direction of the classification zone.

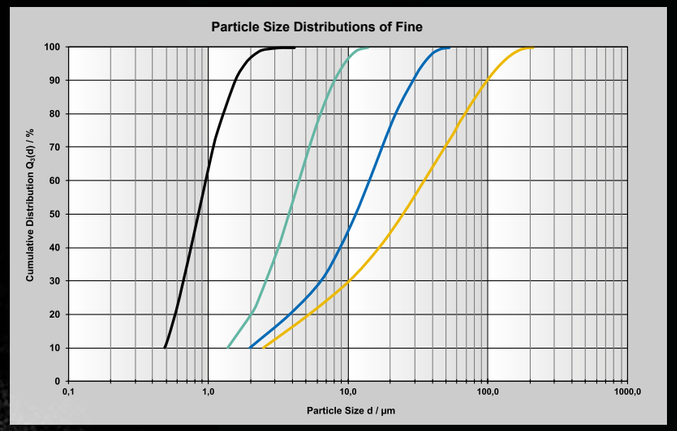
Extensive and detailed testing with the new NEA classifier revealed an magnitude of improvements not only in yield, throughput and energy consumption but also in the range of achievable fineness. The new design now allows widening the possible fineness range from 200 µm to 2 µm instead of 20 µm - comparable to the size of a human blood cell.

Different sizes of the revolutionary new GRC air classifier are available for various throughputs and applications for plastics filling materials but also for minerals, paints and coatings, in the chemical sector or for applications in the food industry, wherever they are needed.

NEA GRC GUIDE RING CLASSIFIER

The maximum yield classifying solution





Extensive and detailed testing with the new NEA GRC classifier revealed a particularly high cut efficiency as well as excellent yields and throughputs. The diagram shows different particle size distributions of the fine material fraction.

Classifier Range	GRC	min.	max.
Airflow Rates	m³/h	1,000	40,000
d_{97}-Values	µm	2	200
Throughputs	t/h	0.05	50

General Description

- Maximum yield classifier with integrated pre-dispersion unit
- Fine fraction particle size top cut: 2 µm - 200 µm
- Capacity: 50 kg/h - 50,000 kg/h
- Classifier power: 10 kW - 300 kW
- Air Flow: 1,000 m³/h - 40,000 m³/h
- Feed particle size: max. 3 mm - 5 mm
- Diameter: up to 2,000 mm

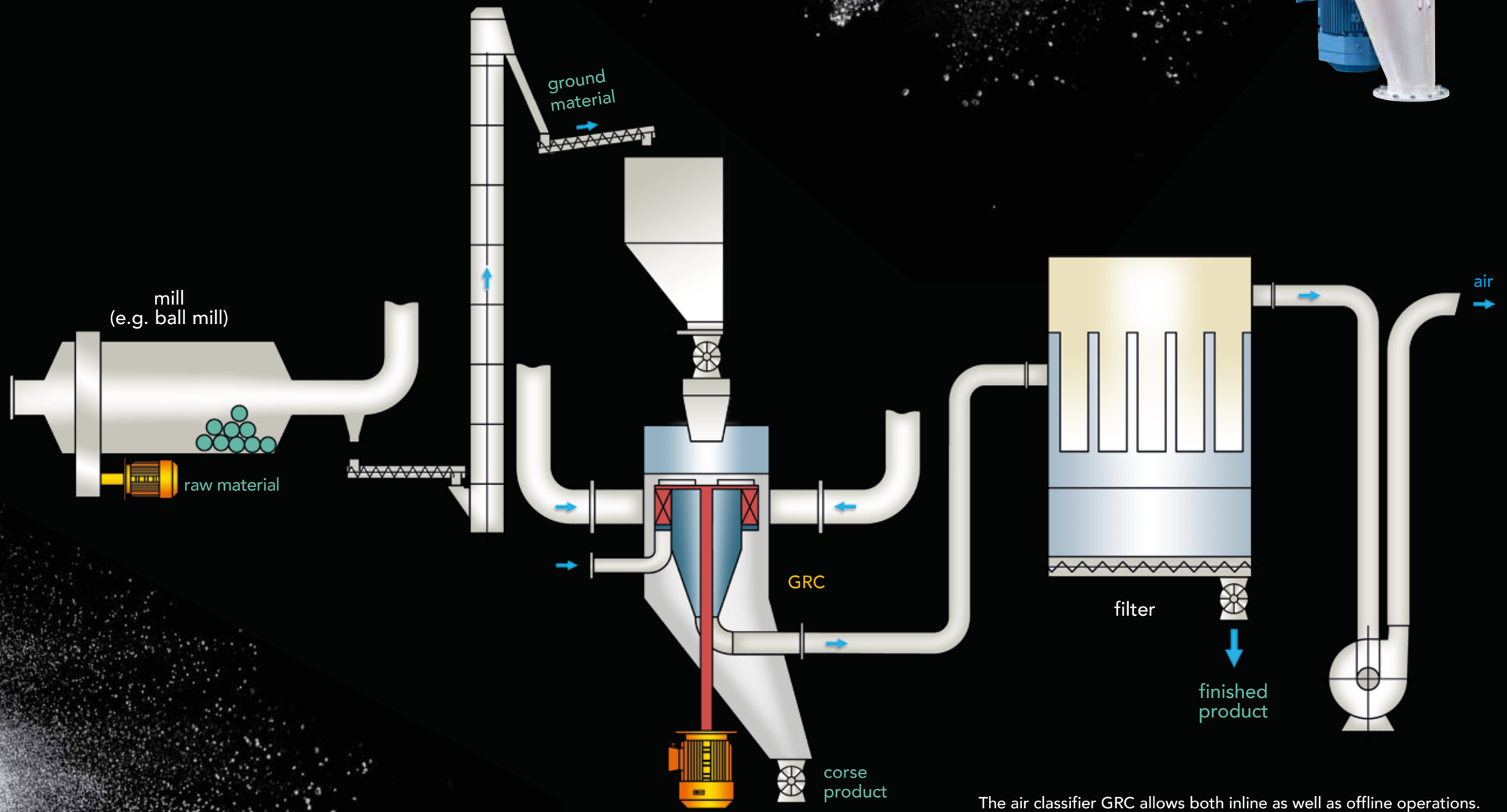
Key Features

- Highly effective integral feed pre-dispersion unit for maximum separation efficiency
- Sharpest top cuts through innovative air guide internals for defined air and material flow
- Unmatched capacities and energy efficiency through unique combination of dispersion and classification
- Well combinable with existing grinding systems (e.g. ball mills, roller mills, impact mills)
- Optional wear protection

Applications

- Fertilizers
- Oilfield Minerals
- Pigments & Paint
- Clay & Ceramics
- Gypsum
- Lime Cycle Carbonates
- Performance Minerals
- and many more …

CONFIGURATION



The air classifier GRC allows both inline as well as offline operations.

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