CALCIUM CARBONATE (GCC)

of the highest quality for polymers, breathable film and paint

HOSOKAWA MICRON

HOSOKAWA ALPINE

Process technologies for tomorrow.

HUGE AND EFFICIENT

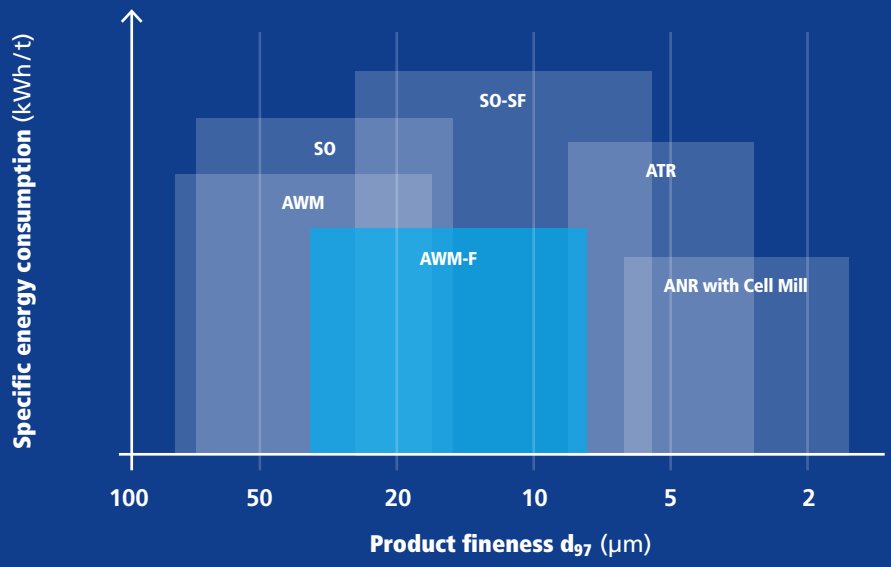
For all those who want more

- **REDUCING OPERATING COSTS THROUGH ENERGY-EFFICIENT PLANTS**
- **COMPLETE SOLUTIONS FROM ONE SINGLE SOURCE – FOR EVERY REQUIREMENT**
- **CONSISTENTLY HIGH QUALITY THANKS TO THE LATEST AUTOMATION AND PROCESS CONTROL**
- **PERFECT TOP CUT LIMITATION OF COATED AND UNCOATED GCC THROUGH INTEGRATED HIGH-PERFORMANCE CLASSIFIER**

PERFECT SOLUTIONS FOR HIGH-QUALITY GCC PRODUCTION

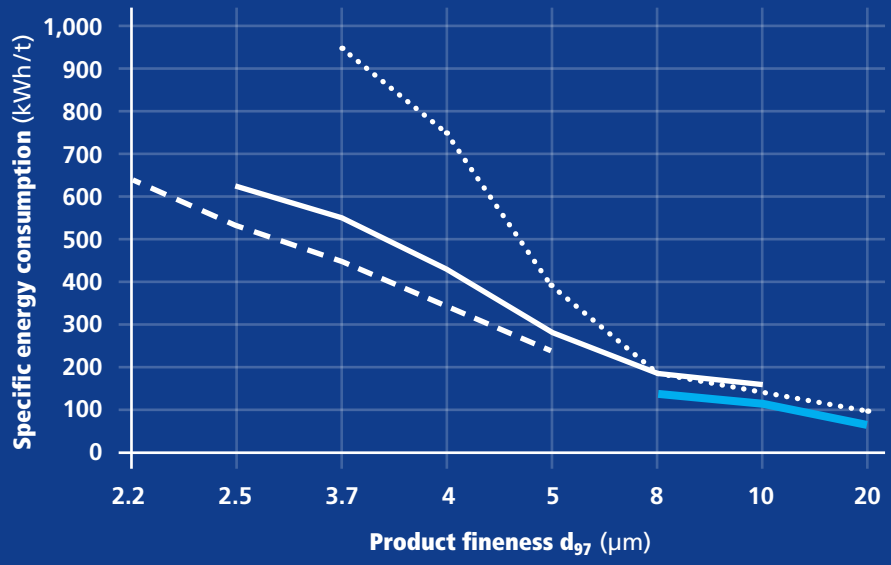
Perfect solutions for high-quality GCC production

Pure filler or high-quality additive? The production of calcium carbonate fillers (GCC) from chalk, limestone or marble is challenging today. GCC stands for dry powder or a suspension and is indispensable in today's industry.
It is found in breathable film for baby nappies, building material, paint and in almost all polymers. The quality requirements of the industry are clear: Filler finenesses in the range d_{97} <10 µm to d_{97} <1.6 µm are essential. We have faced these challenges and today we meet the highest quality standards – worldwide.
Hosokawa Alpine provides the perfect process technology for every demand and covers all areas of (fineness) ranges, capacity and logistical aspects in a customer-specific and cost-effective manner.



Exceptionally fine and highly economic – system selection dependent on fineness demand

SO-SF = Ball Mill Super Orion SUPER FINE
SO = Ball Mill Super Orion
ATR = Agitated Ball Mill
AWM = Table Roller Mill
AWM-F = Latest-generation table roller mill
ANR =Vertical Agitated Mill for wet grinding



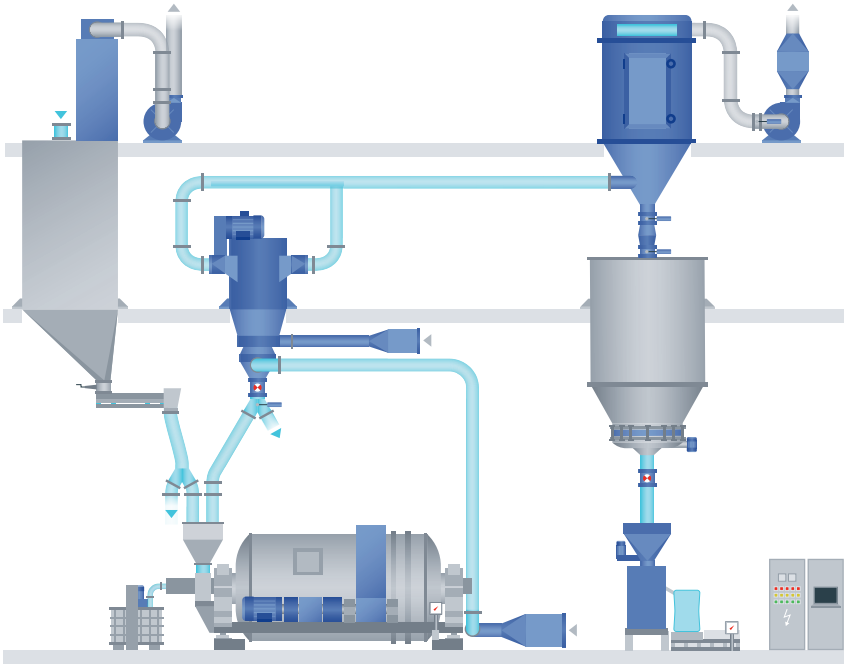
Milling systems in an energy comparison – focus on fineness and energy consumption

AWM-F
SO + TTD
ATR + ATP/NG
ANR-CL + Cell Mill

THE ALL-ROUNDER

For a wide range of fineness values and output rates

Modern ball milling systems guarantee the highest fineness ranges and standard fineness values for fillers in a range of d_{97} = 4 – 40 µm. A major cost factor in production is energy consumption. Modern automation and process control are essential. This is the only way to guarantee cost-effectiveness while maintaining the highest GCC quality and system performance.



THE FACTS

- Fineness range d_{97} = 4 – 40 µm
- Low specific energy consumption
- State-of-the-art automation and process control
- Maximum capacity
- Intelligent machine diagnosis
- Optimised ball mill parameters
- High-performance classifiers with maximum fines yield

TECHNICAL SPECIFICATIONS

	d_{97} = 5 µm	d_{97} = 8 µm	d_{97} = 12 µm	d_{97} = 20 µm	d_{97} = 25 µm
SO-CL-SF 270/400 + 800 TTD	1.5 t/h	2.6 t/h	4.0 t/h	5.7 t/h	6.2 t/h
SO-SF 270/670 + 1000 TTD	2.5 t/h	5.0 t/h	7.3 t/h	9.5 t/h	10.4 t/h
SO-SF 400/500 + 1000 TTD + 1250 ACP	2.5 t/h	5.0 t/h + 5.5 t/h	7.3 t/h + 8.0 t/h	9.5 t/h + 10.4 t/h	10.4 t/h + 11.4 t/h

25 % less energy: With the Alpine Calciplex ACP, efficiency increases significantly.

SO-SF

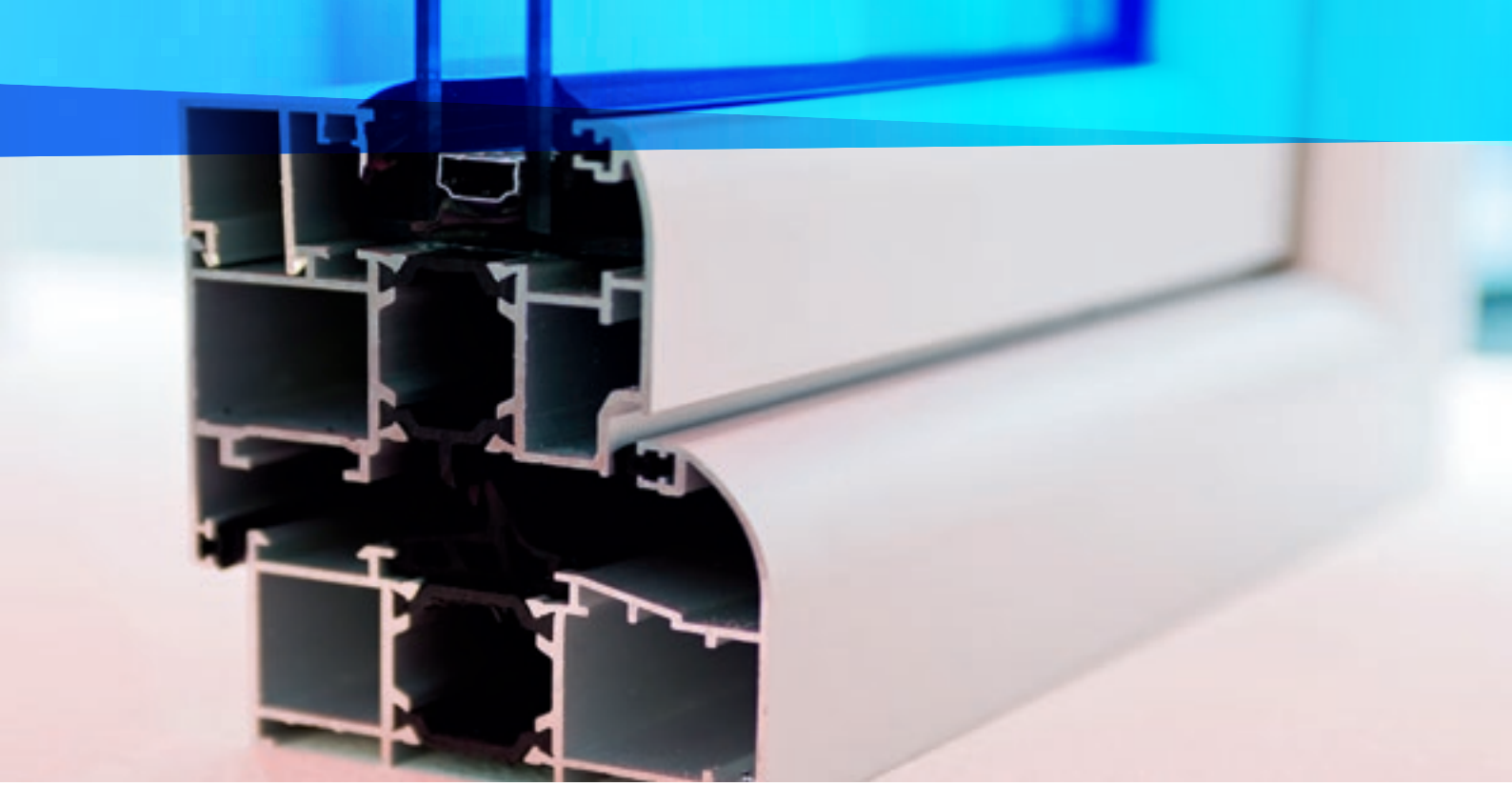
The Super Orion ball mills combine high fineness and minimum specific energy consumption. Each SO-SF is individually adapted to the grinding media type for the desired application and enables perfect grinding control for maximum performance.

TTD

The TTD classifier optimizes the proven Hosokawa Alpine classifying technology using a forced vortex classifier wheel. The split TTD classifying wheel allows higher fineness values thanks to increased circumferential speed. The integrated coarse material classifier and double-flooded fine material outlet optimize the process even more.

ACP

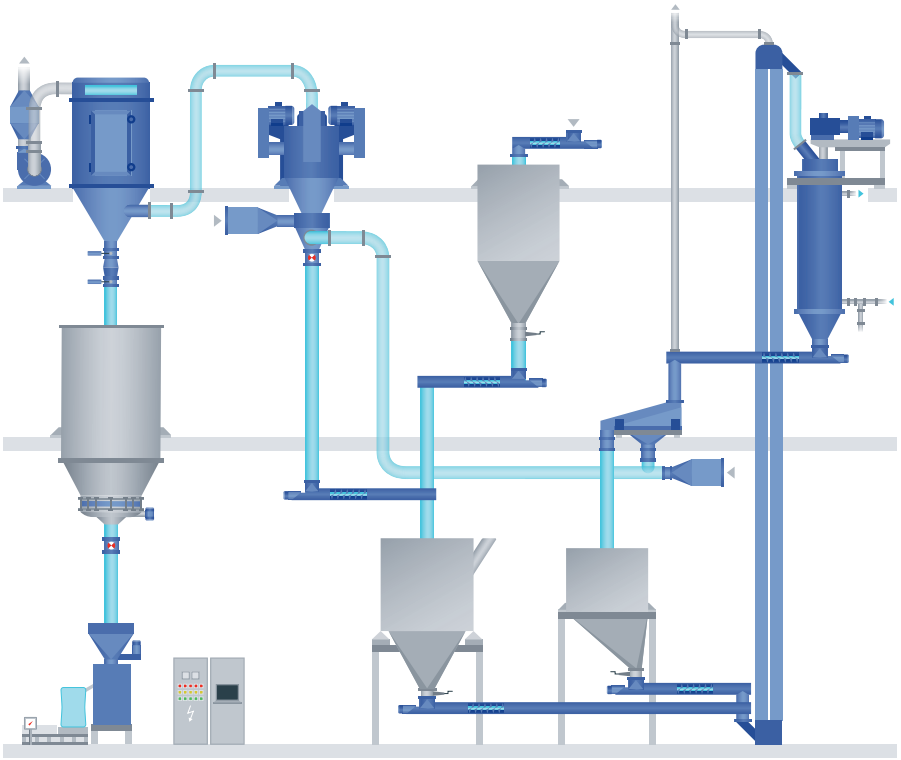
When developing the ACP series, the focus was set on low energy consumption for the entire system. The proven classifier concept from Hosokawa Alpine is based on the forced vortex principle which is applied here and by changing the classifier speed, the end-product fineness can be adjusted over a wide range.



THE ECONOMICAL ONE

For an energy-efficient and cost-effective production of ultrafine GCC powder

The Hosokawa Alpine ATR system in a circuit with a high-performance air classifier is the ultimate energy-saving solution for the generation of ultrafine GCC fillers in the fineness range of d_{97} = 2.5 – 8 µm. Compared to ball milling systems, the system impresses with significantly lower specific energy consumption over the entire grinding system. The ATR rotor works with very little wear due to its low peripheral speed.



THE FACTS

- Fineness range d_{97} = 2.5 – 8 µm.
- Dry grinding system
- Generation of ultrafine powder
- Extremely energy-efficient grinding process in the finest range
- High whiteness due to ceramic lining and ceramic grinding media
- Closed grinding-classifying loop

TECHNICAL SPECIFICATIONS

d_{97} = 3.7 µm	1100 kg/h
d_{97} = 5.5 µm	2200 kg/h
d_{97} = 8.0 µm	3000 kg/h
d_{97} = 10 µm	4000 kg/h

Performance data 900 ATR + 316/6 ATP-NG plant for GCC

Great in product fineness, even better in energy consumption. Low in footprint and CAPEX.

ONE CLASSIFIER, ENDLESS USES.

In combination with ATR systems, the air classifier TTD guarantees an energy-efficient alternative.

ATR

The ATR agitator ball mill is used for the ultrafine grinding of pre-ground mineral fillers. Hosokawa Alpine relies on a lining and grinding beads made of aluminum oxide to minimize abrasion and to achieve the optimal whiteness of the fillers.

ATP

The ATP classifier enables high fineness with low energy consumption. Depending on the fineness and quantity, the ATP classifier is available with either one or more classifying wheels and adapts optimally to all requirements.

PERFECTLY COATED

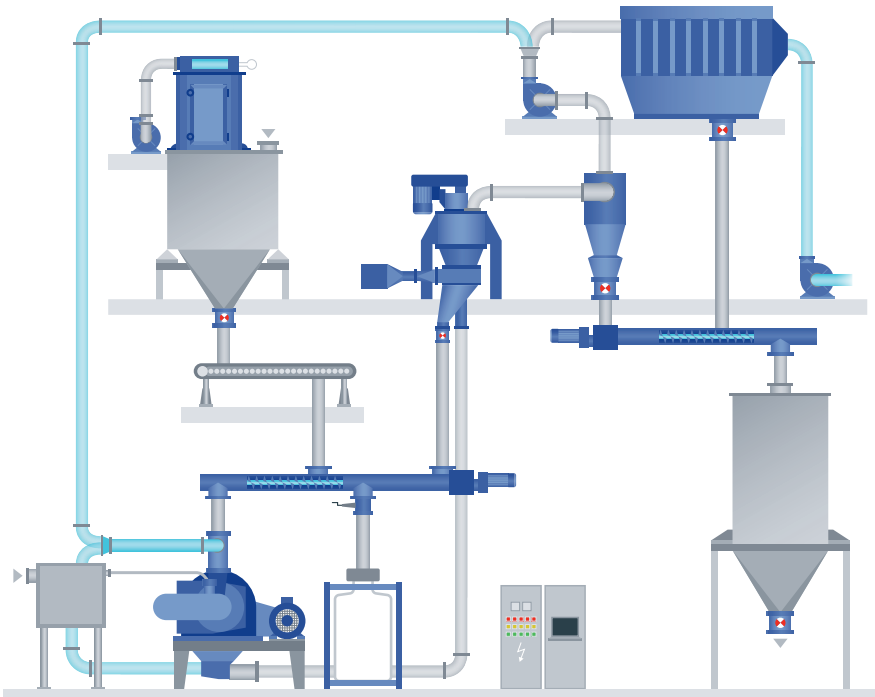
For highest demands in the manufacture of polymers

The requirements of the polymer industry for coated GCC powder are steadily increasing. The result: significantly improved properties (fracture strength, brilliance) of polymers at greatly reduced costs. In practice, continuous coating processes using pin mills such as the Alpine Contraplex yields the right results. With two counter-rotating pin discs, the mill serves as an intensive mixer for a perfect surface treatment with stearic acid or other coating/coupling agents. The temperature profile over the entire coating system is of great importance: The coating quality increases significantly because under hot conditions, the GCC and stearic acid can react optimally with each other.

The newly developed coating system from Hosokawa Alpine is tailored precisely to these requirements and delivers coated GCC of the highest quality at all times.

THE FACTS

- Highest coating quality
- Integrated safety classification e. g. set at 20 µm
- Low stearic acid consumption
- Highly energy-efficient
- Preheating of GCC feed
- Temperature profile control over the entire system
- Stearin acid recycling



TECHNICAL SPECIFICATIONS

d_{97} [µm]	400 CW + MS-2H (A)	400 CW + MS-3H (FO)	630 CW + MS-3 (A)	630 CW + MS-4H (FO)	800 CW + MS-4H (A)	800 CW + MS-5H (FO)
3.7	0.8 t/h	3.0 t/h	1.6 t/h	6.0 t/h	3.2 t/h	12.0 t/h
5	1.0 t/h	3.0 t/h	2.1 t/h	6.0 t/h	4.2 t/h	12.0 t/h
10	1.4 t/h	3.8 t/h	2.9 t/h	7.5 t/h	5.8 t/h	15.0 t/h
15	1.8 t/h	3.8 t/h	3.5 t/h	7.5 t/h	7.0 t/h	15.0 t/h
20	1.8 t/h	3.8 t/h	3.5 t/h	7.5 t/h	7.0 t/h	15.0 t/h

(A): Advanced system with classifier
(FO): Fully optimized system with preheating and classifier

DISCOVER THE **DIFFERENCE**

Highest coating quality through perfect hydrophobization. The practical test proves it: clear water after two minutes stands for good quality.

CONTRAPLEX PIN MILL CW II

The Contraplex fine impact mill enables high differential speeds of up to 240 m/s. At the same time, the two counter-rotating discs prevent build-up. The hinged mill door can be opened for easy cleaning.

ECONOMICAL COMMINUTION

For high fineness values and steep particle size distributions

Low grinding energy, very high fineness: Wet grinding systems score high points with an extremely economical micronisation technology. Very steep particle size distributions are required for various applications in the polymer and paper sectors.

These are achieved in wet grinding without the use of dispersing and with low solids content. The suspensions can then be dried or used directly as a slurry in the paint or paper industry. The components of the ANR-CL and Cell Mill system are perfectly matched to each other and cover both the high fineness range for standard GCC qualities and the very profitable sector of very steep particle size distributions.

THE FACTS

- Wet processing, drying and coating of GCC
- Medium to high capacities (212 t/h)
- GCC as slurry for paint and paper
- GCC as powder (coated or uncoated) for polymers, paint or paper
- Highly energy efficient
- Low footprint

ANR-CL

The ANR-CL is designed for economical fine grinding of GCC. The geometry of the mill allows easy scale-up for large production capacities. The smallest ANR-CL model starts with a 45-kW drive and extends to mills in the megawatt range.

THE DETAILS MAKE THE DIFFERENCE

Individual requirements call for individual solutions

› *FOOD & PHARMA*

Finest GCC is used in the pharmaceuticals and food industries. Since GCC is chemically pure and without secondary contamination, this additive meets the strictest standards such as EU Regulation 231/2012.

› *BREATHABLE FILM*

The baby boom and the aging world population mean that the need for high-quality diapers is rapidly increasing. Breathable film is essential for these diapers, and this film needs a special very steep, ultrafine, super-dry and perfectly coated BF-GCC (BF = breathable film).

› *PAINT*

With the Hosokawa Alpine ANR-CL wet grinding systems, suspensions and powders for paints can be produced cost-effectively. The advantage for slurry use in the paint industry: Both water and dispersant are already included.

› *RUBBER*

GCC or PCC suspensions with a very high degree of fineness are used to manufacture rubber gloves. The Hosokawa Alpine wet mill ANR-CL produces these high-grade qualities cost-effectively down to a fineness of d_{99} = 2 µm.

› *MASTERBATCH*

For the production of masterbatches by extrusion, fine, high-quality, almost water-free and perfectly coated GCC or BF-GCC is essential. The combination of ANR-CL + Cell Mill makes it possible.

› *PAPER*

Not until the advent of ground calcium carbonate (GCC) was it possible for paper factories to switch from acid to neutral paper production. Today GCC is the most commonly used mineral in papermaking.

CELL MILL

The Atritor Cell Mill is a powerful mechanical mill that is often used to dry suspensions. GCC coating can take place in a very efficient way in drying mode at the same time. The integrated classifier controls the top cut of the GCC efficiently.

ENERGY EFFICIENCY^2

Energy-optimized grinding system AWM-F

The AWM-F is the consequent development of the AWM vertical roller mill, however, for a fineness range of d_{97} = 8 – 40 µm. The grinding zone and grinding technology have been completely redeveloped. The energy efficiency has been significantly improved and the capacity has been tremendously expanded. This means that the AWM-F vertical roller mill sets new standards for the future when it comes to producing the finest non-abrasive mineral powders.

THE FACTS

- Robust construction guarantees maximum smoothness in running condition and longevity
- Low pressure loss across the entire grinding system
- Use of the newly developed Alpine Calciplex ACP classifier as the classifier head of the AWM-F
- Energy savings of up to 25 % compared to ball grinding systems
- Highest capacities in the fineness range d_{97} = 8 – 40 µm

AWM-F 1500 FOR GCC

Mill drive	315 kW	d_{97} = 8 µm	5 t/h
Classifier drive	132 kW	d_{97} = 10 µm	6 t/h
Blower drive	355 kW	d_{97} = 15 µm	8.5 t/h
		d_{97} = 20 µm	11 t/h

HIGH-TECH CLASSIFIER OF THE NEWEST GENERATION

Energy-efficient classifier generation

Energy efficiency today is a key issue: the Alpine Calciplex ACP succeeds in even surpassing the demands made of an air classifier to produce the finest, non-abrasive mineral powders. The result: the highest levels of fineness and yield, as well as significantly improved energy efficiency. An advantage that will set new standards in the classification of mineral powders in the future.

THE FACTS

- Robust construction guarantees maximum smoothness in running condition and longevity
- Low pressure loss
- Low classifier speed
- Visible wheel optimization based on the in-house developed NG geometry
- Energy savings of up to 25 % compared to already established machine generation

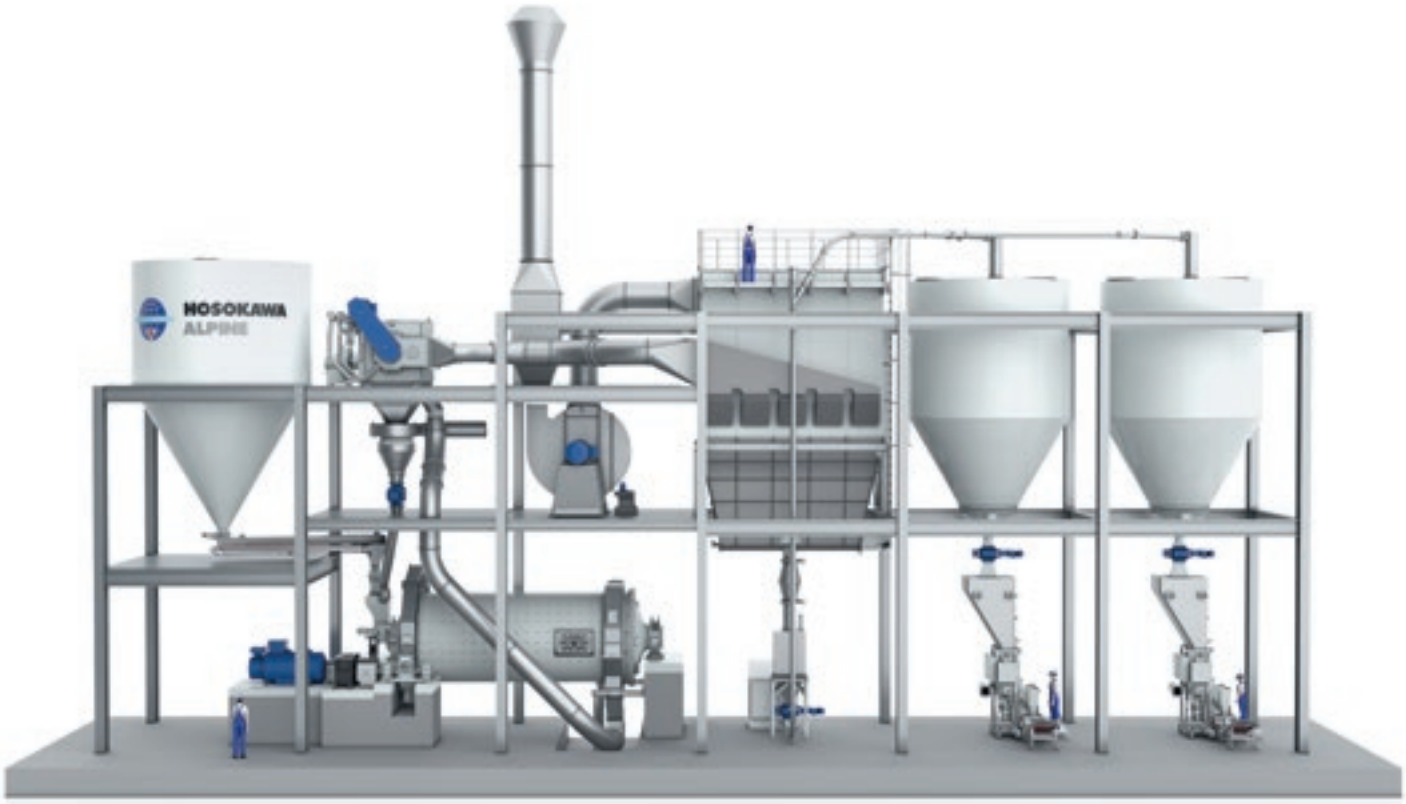
ACP SERIES	***800***	***1000***	***1250***
Scale-up factor	1	1.6	2.5
Fineness, max d_{97} (µm)	6	7	8
Drive, standard (kW)	45	75	110
6 µm (kg/h)	1,600		
8 µm (kg/h)	2,700	4,400	6,800
10 µm (kg/h)	3,600	5,800	9,000
20 µm (kg/h)	6,300	10,100	15,800
45 µm (kg/h)	9,500	15,200	23,800

Fines capacity at d_{97}

WE SET STANDARDS

From basic engineering to state-of-the-art turnkey systems

Whether a single machine standard concept or special solution: Hosokawa Alpine has a wide range of grinding and classifying systems for all requirements of the mineral powder industry. As a global system partner, we accompany our customers through the entire process. From basic engineering the development, erection and start-up of ultra-modern turnkey systems. Whether "Green-Field" systems or the integration into existing production systems: Hosokawa Alpine covers all processing stages in the engineering, delivery, assembly and commissioning. You can count on us as your competent partner – from the preliminary crushing, drying, grinding, air classification and storage right up to packaging and loading onto trucks. The scope of delivery includes all conveying units, steel construction, piping, silos and electrical wiring.



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ADVANTAGEOUS SYNERGIES

The know-how and experience of numerous specialists are pooled in the Hosokawa Micron Group to produce perfect solutions. Experience from a variety of customer segments in mechanical process engineering ensures that you, as the manufacturer, enjoy optimum solutions for practically every product – from an individual component to an entire plant.

INNOVATIVE TEST CENTRES

Our research and testing facilities can provide you with a wealth of machines and complete systems for the most varied plant configurations, all available on a global level. Precision, quality and innovative technologies: Do your testing with us.

YEARS OF EXPERIENCE

Profit from our many years of experience in the provision of solutions and our mastery of sophisticated processes. Well-known customers all over the world place their trust in the technology and know-how of the Hosokawa Micron Group.

GLOBAL SERVICE

Our service teams take care of repairs and maintenance, both on site and in our modern workshops equipped with the latest technology – smoothly, speedily and all around the world! The Hosokawa Micron Group – a partner you can rely on. Find out for yourself, you're sure to be impressed.

RENTAL AND USED MACHINES

Whether stand-alone machines or a system in containers that is practically ready for operation: rental machines increase your flexibility. Completely overhauled used machines with the distinctive name "Alpine Originals" score high points thanks to the customary Alpine quality paired with short delivery times.

HOSOKAWA ALPINE

Process technologies for tomorrow.

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Just call us - we will be happy to help.

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