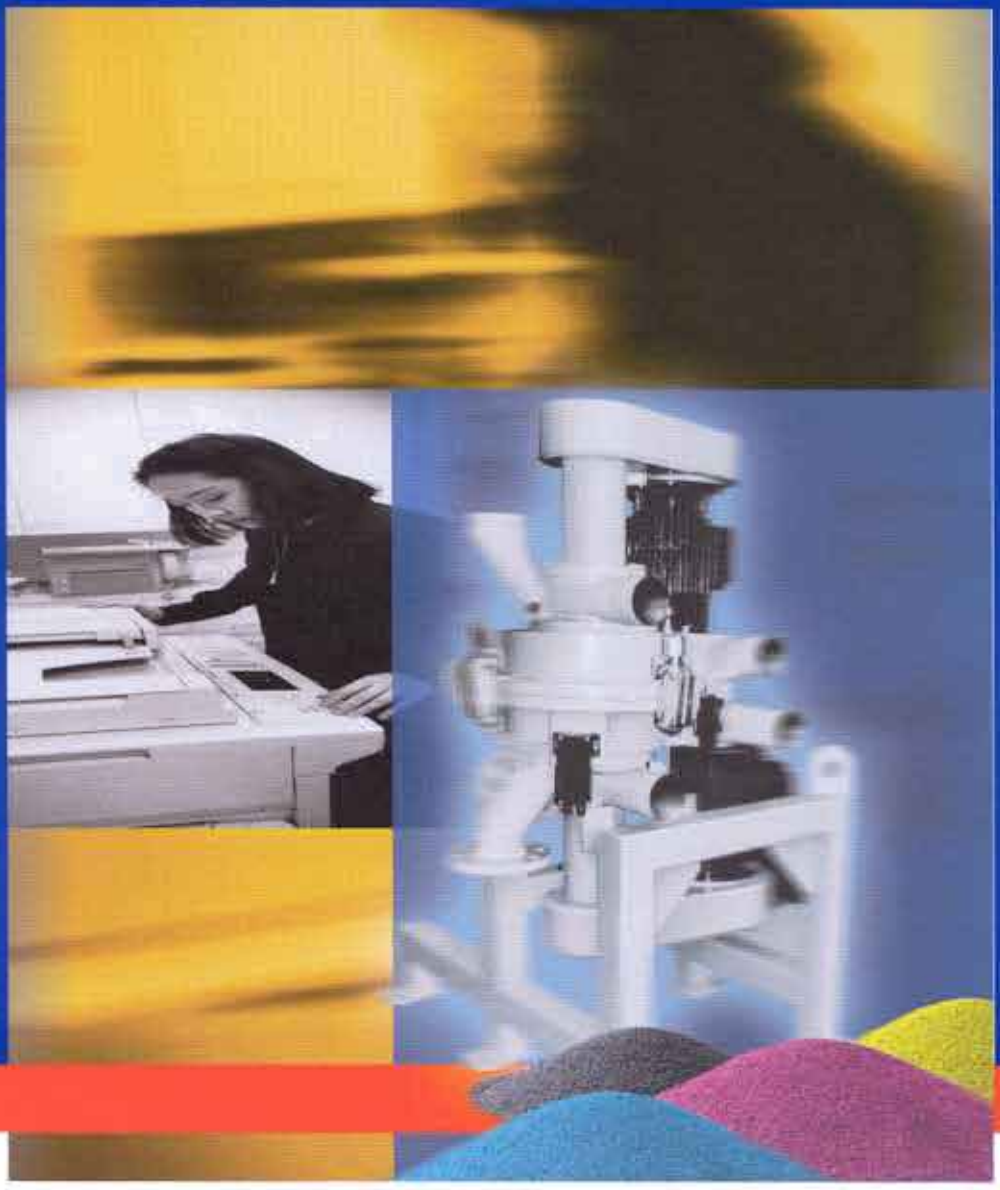
POWDER AND PARTICLE PROCESSING
For the Toner Industry



HOSOKAWA MICRON GROUP

PROCESS TECHNOLOGIES FOR TOMORROW℠

ALPINE® BEPEX® MICRON® STOTT® VRIECO-NAUTA®

POWDER AND PARTICLE PROCESSING FOR THE TONER INDUSTRY

ONE OF OUR CORE BUSINESSES

WE ARE YOUR

HOSOKAWA MICRON GROUP
The HOSOKAWA MICRON GROUP is an international provider of equipment and systems serving a broad range of industries which includes chemical, minerals, pharmaceutical, polymer, food, blown film processing, confectionery and bakery, and specialised food.

The HOSOKAWA MICRON GROUP's broad range of powder and particle processing capabilities includes equipment and technologies for a variety of applications including:

- Agglomeration / Granulation
- Compaction / Low-Pressure Extrusion
- Size Reduction / Micronisation
- Mixing / Powder Blending
- Screening / Air Classification
- Drying / Vacuum Drying
- Product Collection / Containment
- Hygenic Filling and Weighing
- Bulk Packaging
- Toll Processing

It is the strategic objective of the Hosokawa Micron Group to extend its leadership into future markets with high-technology products, to provide economic technical solutions and to ensure customer satisfaction.

HOSOKAWA MICRON places a strong emphasis on research and development. Major technical centres are located around the world. They are equipped and operated for the dual purpose of conducting original research work and demonstrating various processing systems. For our customers, the technical centres are used to develop and test formulations to meet their specific needs for powder and particle processing applications.

COMPETENT PARTNER

Since the advent of modern office equipment such as printers and photocopiers, we have focused our efforts on the processing of toner powder. And during the process, we have not just been an onlooker, but rather have been instrumental together with our customers in setting milestones.

DELIVERED SYSTEMS

Toner manufacturers around the world operate processing systems which make use of HOSOKAWA ALPINE's grinding and classifying systems. To date, HOSOKAWA has supplied over 200 processing systems to leading toner manufacturers. The product range covers small test or laboratory systems just as it does large production-scale systems, with the throughput rates ranging up to 500 kg/h.

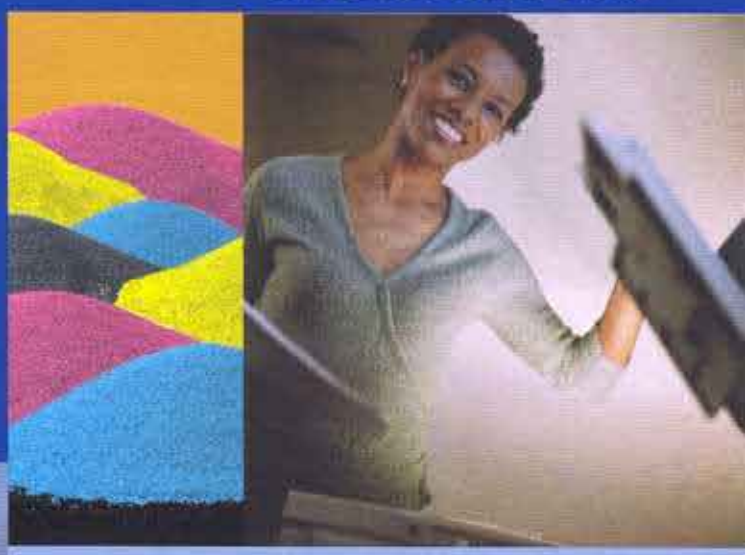
Our customers know that we always make use of only the very best and latest technology, especially with respect to achieving top quality at the lowest possible capital outlay and operating costs. This is what has made us so successful in the past and is simultaneously our challenge for the future.

In spite of the fact that toner systems all basically operate in the same way, it is the details which make the difference and which we tailor to suit the customers' individual requirements.

SAFETY FIRST

This is not something that the HOSOKAWA Group just pays lip service to, but rather a commitment to our customers to supply safe equipment and systems. Explosion protection is an issue which takes top priority during the design and manufacture of our toner systems. HOSOKAWA specialises in complete toner systems – from the design and manufacture to the installation, maintenance and service. And what this means for our customers is:

EVERYTHING FROM ONE SINGLE RESPONSIBLE SOURCE.



TRAINED PERSONNEL PROVIDE OUR CUSTOMERS WITH COMPETENT ADVICE IN ALL OUR BUSINESS SECTORS.

POWDER AND PARTICLE PROCESSING

SINGLE MACHINES AND TURNKEY PLANTS

Off-line or in-line is a question of the philosophy:

OFF-LINE PROCESS:
- maximum flexibility
- modest overall height
- simple optimisation

IN-LINE PROCESS:
- automatic mode
- reduced container handling
- less space requirement

The following description concentrates on an off-line process, because this is what most of our customers prefer. In off-line mode, the material is filled into containers after every process step, which then serve as feed bins for the next process step. Some system components can be cleaned or maintained while other components are in use. Each process step can be individually optimised.

Hosokawa has been supplying toner systems in a great variety of different designs to every renowned toner manufacturer around the world for over 20 years. The actual process can be broken down into the following steps:

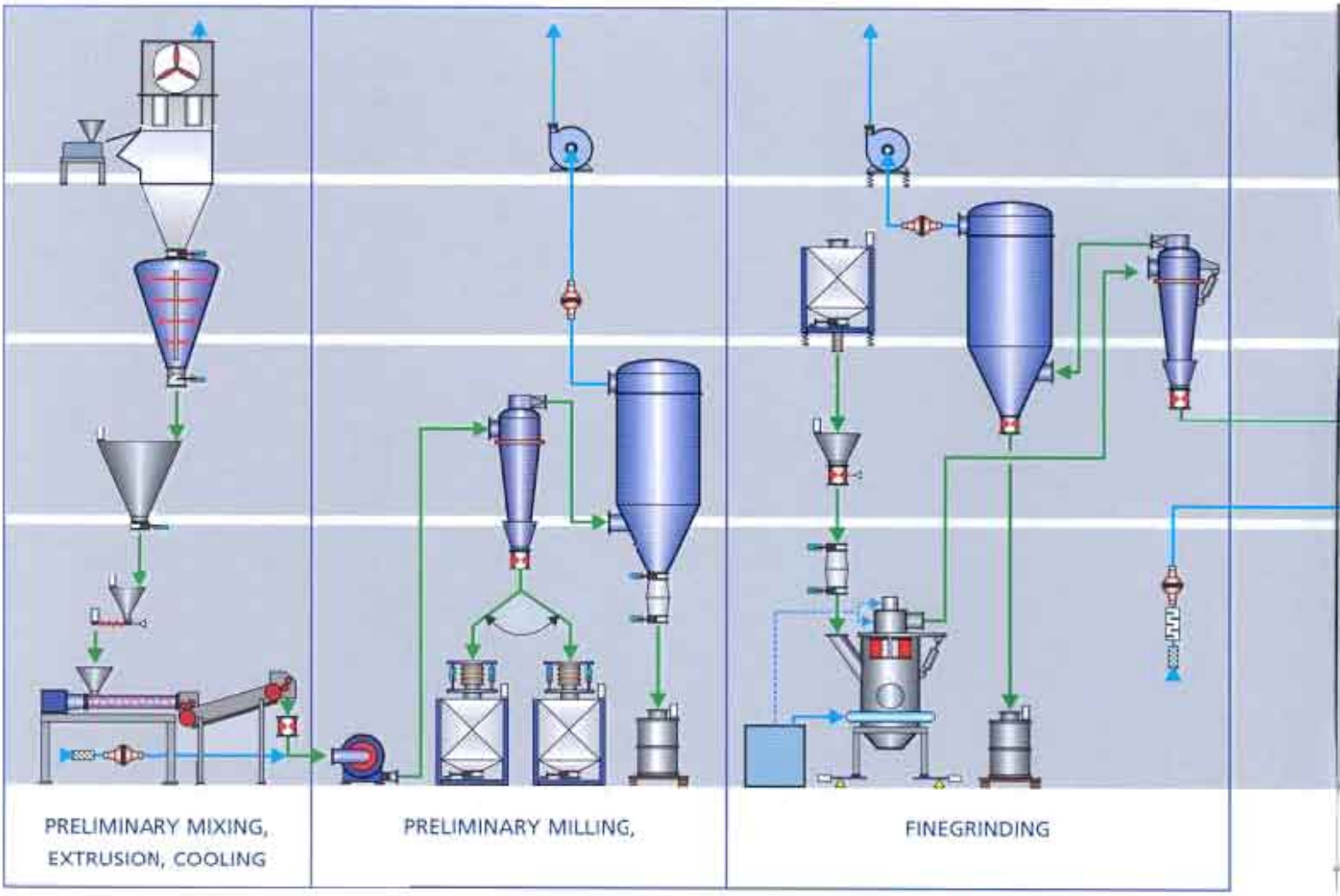
Preliminary mixing, extrusion, cooling:
The individual components are prepared, weighed and then filled into a high-speed preliminary mixer. The pre-mixed raw materials are metered to an extruder. The pasty toner mass is discharged from the extruder into a cooling unit (e.g. chill roll, metal cooling conveyor, etc.). At the end of the cooling section, a flake breaker pre-crushes the cooled toner mass to the size of chips.

PRELIMINARY GRINDING OF THE CHIPS:

Dependent on the grindability and the wear behaviour of the material, the following Hosokawa mills can be used:

- Rotoplex granulator
- Fine impact mill UPZ
- Sieving mill

Preground to granules, the material is collected in a cyclone or filter and then filled into containers.



PRELIMINARY MIXING, EXTRUSION, COOLING

PRELIMINARY MILLING,

FINEGRINDING

FINE GRINDING:

A vibrating table empties the preground granules out of the container. The toner is now metered via a variable-speed metering unit and a double flap valve to the opposed jet mill TFG. Dependent on the grindability of the different toner types, either Laval or particularly efficient Mega-Jet nozzles are employed. The level of material in the mill is monitored and regulated by load cells. If necessary, the speed of the metering unit is adjusted accordingly. The ground material is conveyed further to a cyclone and then either discharged into a container or direct into the downstream classifier.

CLASSIFICATION:

The classifier can either be fed from a container or from the cyclone of the fine grinding step. The problem specification dictates which of the two specially developed toner classifiers, i.e. TSP or TTSP, is employed. A specially designed flap valve serves as the air seal for the coarse material discharge. The fines are collected either in a cyclone or a filter. The advantage of off-line mode is that the classifier can be operated and optimised independent of the mill.

ADDITIVES:

In order to improve the flow behaviour and to influence the surface properties, the toner is coated with different additives. The container with the coarse material from the classifier then becomes the feed bin. Both toner and additives are metered by gravity into a high-speed fluid mixer, after which the blended material is either refilled into a container or fed to a screening machine via an intermediate bin.

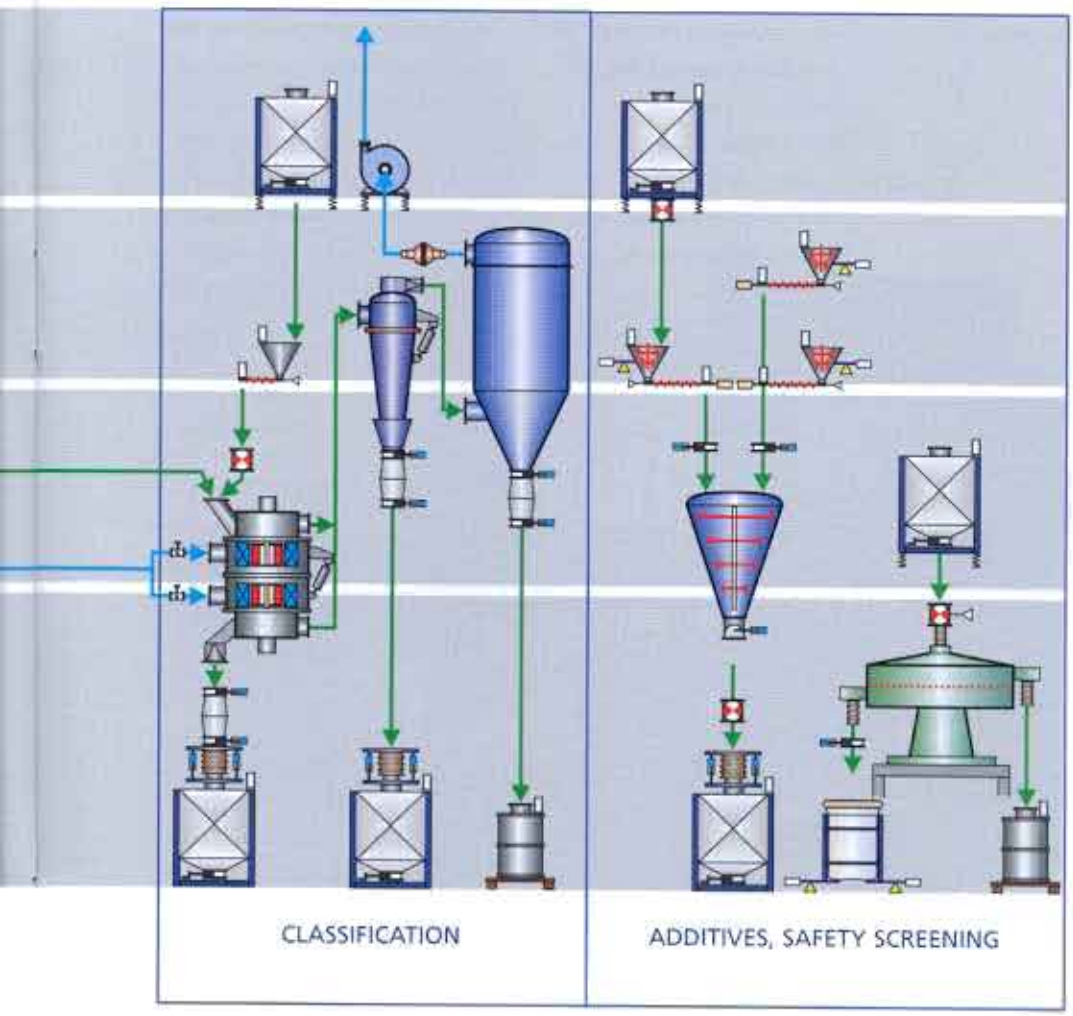
SAFETY SCREENING:

Any flakes still remaining in the product are screened out here. In most cases, a tumbler screening machine with a screen mesh width of 125 µm is used. The coarse material is waste and the fine material is the finished toner, which is filled via airtight devices into containers or drums positioned on floor scales.

EXPLOSION PROTECTION:

Toner is a material which is prone to dust explosions. Because of this, special safety measures must be taken. The following concepts are in use:

- Pressure venting
- Explosion suppression
- Pressure-shock-proof design to 10 bar overpressure



PRELIMINARY MIXING, EXTRUSION, COOLING

HOSOKAWA MICRON

PRELIMINARY MIXING

The different toner raw materials such as resin, pigments, and additives, etc. are mixed in high-speed mixers, e.g. Cyclomix. The demands made on the mixers are many and varied:

- Easy to clean
- Double-walled mixing vessel to permit cooling if necessary
- Simple filling of the different raw materials into the mixer
- Mixer must be simple to completely empty after the mixing process
- High peripheral speeds of the mixing media for short mixing times and good blending
- Product-contact surfaces polished to Ra 0.8 µm for simple cleaning
- Pressure-shock-proof design to 10 bar overpressure
- Pole-reversible or frequency-regulated motor
- Wear-protected mixing media

EXTRUSION

A feeding unit feeds this premix continuously into the feed barrel of a compounder such as the Werner & Pfleiderer ZSK twin-screw compounder.

The product is drawn in by the closely intermeshing co-rotating screws of the ZSK, conveyed downstream and then compressed. Kneading elements in the plasticising zone serve to melt the product. During and after plastification, the individual components are dispersed, compounded and homogenised. To this end, the ZSK screw speeds are variable, ranging between n = 200 rpm for normal production and 900 rpm. The corresponding temperatures in the processing section lie between 60°C and 180°C. The throughput rate depends on the product quality, the product feed behaviour and the drive power of the ZSK.

COOLING

The product is cooled in a cooling unit and then coarsely crushed before being ground.

WERNER & PFLEIDERER
ZSK TWIN-SCREW
COMPOUNDER

PRELIMINARY CRUSHING

The machines used for the preliminary crushing step are selected as a function of the toner quality. Regardless of whether the toner is tough and resilient, brittle, or has abrasive properties –

HOSOKAWA HAS THE RIGHT SOLUTION!

HOSOKAWA ALPINE
FINE IMPACT MILL TYPE 315 UPZ

- For abrasive toner which is difficult to grind
- Minimum fine dust generation
- Pneumatic product feed and discharge

- Design: pressure-shock-proof to 10 bar overpressure
- Tangential material discharge
- Grinding media: swing beater unit with short grinding track and 2-mm sieve insert
- Reduced-speed mode
- Drive motor: 7.5 kW
- Throughput range: 100-300 kg/h

HOSOKAWA ALPINE GRANULATOR
TYPE 28/40 ROTOPLEX

- For toner which is tough and resilient but not abrasive
- Extremely small fines portion due to the particularly gentle size reduction method
- Special designs available for direct transfer of material from the cooling conveyor which permit a compact system set-up

- Design: not pressure-shock-proof
- Grinding media: cross-scissor-cut rotor and 2-mm screen
- Reduced-speed mode
- Drive motor: 7.5 kW
- Throughput range: 100-300 kg/h

HOSOKAWA BEPEX
SIEVING MILL TYPE FC

- Low-speed grinding system for types of toner which are easy to grind
- Pressure-shock-proof design not necessary
- Extremely small fines portion
- No additional venting via cyclone or filter necessary
- Compact design
- Simple integration into process sequence

- Design: not pressure-shock-proof
- Grinding media: rotor with sieve grate and 2-mm sieve
- Drive motor: 2.2 kW
- Throughput range: 100-300 kg/h

FINE IMPACT MILL
TYP 315 UPZ

GRANULATOR
TYPE 28/40 ROTOPLEX

SIEVING MILL TYPE FC

POWDER AND PARTICLE PROCESSING

FINE GRINDING

HOSOKAWA MICRON

Systematic refinement of the Alpine® jet milling technology led to development of the TFG opposed jet mill. The TFG jet mill was designed especially for fine grinding toner. A steep particle size distribution with clean-cut top size particles and a low fines portion characterise the TFG.

TONER FLUIDISED BED OPPOSED JET MILL TYPE 800 TFG

The special advantages of this new mill generation are the ease of handling, the accessibility and easy cleaning. System users are enthusiastic about the high degree of flexibility of the TFG, especially when coloured toners are being processed and the colour needs to be changed frequently. The typical feed size of the raw material – normally preground chips from the extruder – is approx. < 1–2 mm. The TFG can be fed either by gravity or pneumatically.

MORE ADVANTAGES OF THE TFG:

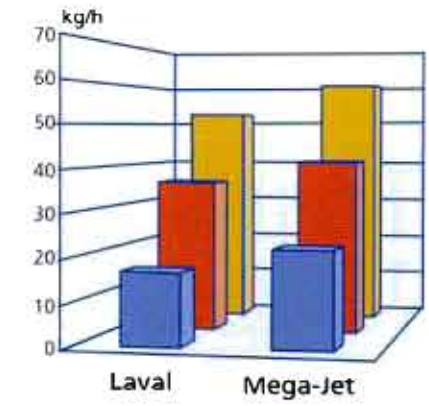
- No need to reset the gap when changing the classifying wheel
- Minimum downtime, easy opening with hydraulic opening mechanism
- The central screw makes it easy to exchange the inside components
- Simplified handling and maintenance
- Filling level control by means of load cells thus optimum throughput rate and constant product quality
- End product free from spatter grain
- Low-wear grinding

TFG HALF OPEN

TFG COMPLETELY OPEN

LARGE OPENING FOR CLEANING AND MAINTENANCE

COMPARISON OF NOZZLES



Difficult to grind
Limited grindability
Easy to grind

- Low energy consumption compared with other jet mills
- ALPINE Mega-Jet nozzles for cost-effective operation

Use of the patented Mega-Jet nozzles results in a greater jet surface and allows a higher feed rate, meaning that up to 20% higher throughput rates are possible at simultaneously drastically reduced specific energy consumption rates.

MACHINE DESIGN OPTIONS:

- Systems in pressure-shock-proof design to 10 bar overpressure
- Mild steel
- Stainless steel
- To order, surfaces polished to Ra≈0.8 µm
- Product feed either by gravity or pneumatic
- Mega-Jet or Laval nozzles, dependent on the grindability of the toner
- Wear-protected (hard-metal-coated) classifying wheel

TFG Toner Fluidised Bed Opposed Jet Mill	Type	400	630	800	1000
Scale-up factor	f	1.0	2.5	4.0	6.4
Motor power	kW	7.5	18.5	30	45
Grinding air	Nm^3/h	1150	2850	4550	7200

TFG OPPOSED JET MILL

TFG CLASSIFYING WHEEL

OPPOSED JET MILL TYPE 200 AFG IN MONOBLOC DESIGN

OPPOSED JET MILL TYPE 100 AFG

AFG OPPOSED JET MILL

To round the product line off, the range also includes the time-tested and proven Alpine opposed jet mill AFG. This ensures that even if the throughput requirements are low, the unique processing advantages of the Alpine® jet milling technology can be exploited to the full.

AFG Fluidized Bed Opposed Jet Mill	Type	100	140	200	280
Scale-up factor	f	0.06	0.15	0.25	0.6
Motor power	kW	1	2.2	4	5.5
Grinding air	Nm^3/h	60	170	300	600

POWDER AND PARTICLE PROCESSING

CLASSIFYING

HOSOKAWA MICRON

In order to meet the rising market demands, ALPINE® has systematically refined its already very successful classifying technology. The result is something to be proud of. The ALPINE® Tandem Toner Classifier TTSP puts a completely new slant on classifying technology.

The design of the TTSP classifier differs from conventional classifier types in the following points:

- Two-stage classification in one machine
- Product feed option: either pneumatic or by gravity
- Separate classifying stages with independent drives
- Hydraulic opening mechanism permits easy opening and machine cleaning, thus
- minimum downtime when changing over to a different colour

Good accessibility and quick classifying wheel change

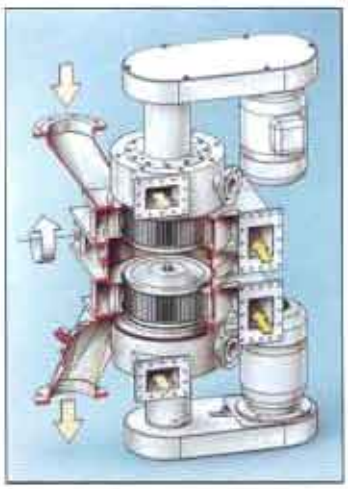
Compact design

Conversion to one-stage classifying if demanded by the application

The processing-technological advantages are obvious and convincing:

- High coarse material yield
- Excellent product quality brought about by steep particle size distribution and low portion of fines
- Low pressure drop, thus use of conventional fans possible
- High feed rates, thus small units possible
- Finer separations possible compared with conventional high-efficiency classifiers
- Low energy requirement, thus possible to process toner, e.g. coloured toner, with a low melting point
- Fine/coarse classification, thus three fractions in one process step, or fine/fine classification, thus extremely low fines portion in coarse material

PRINCIPLE OF OPERATION TANDEM TONER CLASSIFIER TTSP

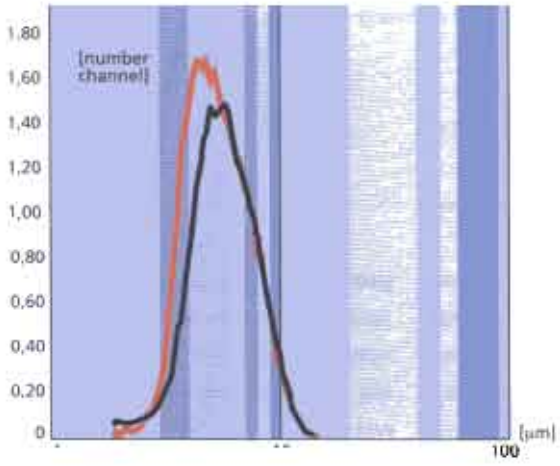


SIMPLE TO CLEAN 200 TTSP OPEN

TANDEM TONER CLASSIFIER TYPE 200 TTSP

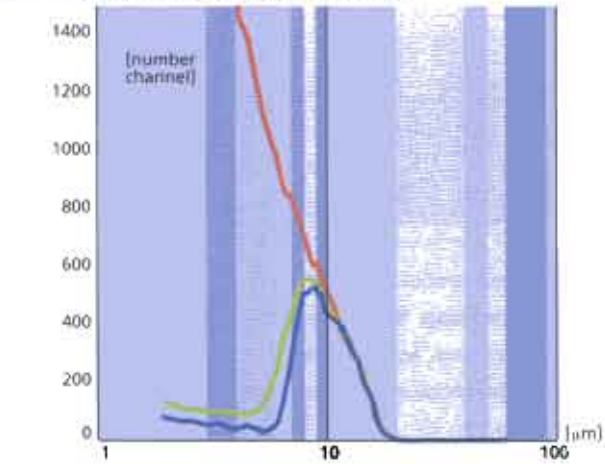
TTSP Classifier	Type	200	250	315	400	500
Scale-up factor	f	0.4	0.6	1	1.6	2.5
Motor power	2 x kW	3	5.5	7.5	11	18.5
Air flow rate	Nm^3/h	1120	1800	2800	4600	7200
Feed rate	kg/h	170	270	420	690	1080

Tandem Toner Classifier TTSP
Toner Classifier TSP



STEEPER PARTICLE SIZE DISTRIBUTION,
LESS FINES IN THE END PRODUCT

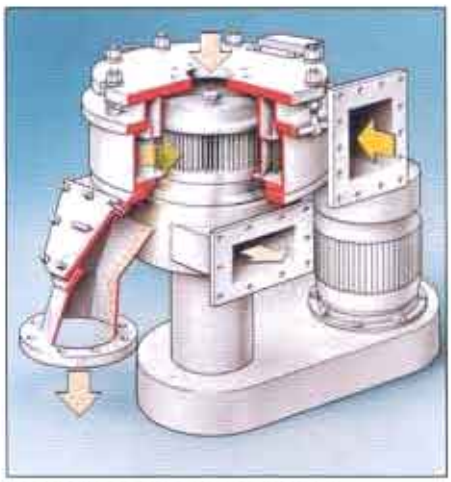
TFG / AFG
1st classifying stage: 86.5% yield
2nd classifying stage: 85.5% yield



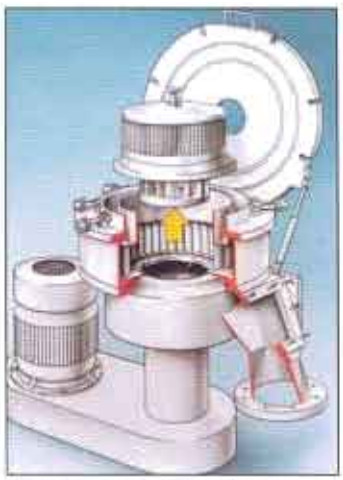
DISTINCTLY BETTER PRODUCT
QUALITY, HARDLY ANY LOSS OF
COARSE MATERIAL.

DESIGN VARIANTS:
TTSP / TSP

- Pressure-shock-proof design to 10 bar overpressure
- Mild steel
- Stainless steel
- Small classifiers in monobloc design
- To order, product-contact surfaces polished to Ra 0.8 µm
- Wear-protected (hard-metal-coated) classifying wheel



PRINCIPLE OF OPERATION
TONER CLASSIFIER TSP



SIMPLE TO CLEAN
TONER CLASSIFIER TSP

To complete the product line and for simple problem specifications:
TSP toner classifier with one classifying stage and one drive.

The above-mentioned advantages regarding handling and cleaning also apply in essence to the TSP classifiers.

TSP Classifier	Type	200	250	315	400	500
Scale-up factor	f	0.4	0.6	1	1.6	2.5
Motor power	kW	3	5.5	7.5	11	18.5
Air flow rate	Nm^3/h	560	900	1400	2300	3600
Feed rate	kg/h	60	90	140	230	360

POWDER AND PARTICLE PROCESSING

MIXING | BLENDING | SAFETY SCREENING

Together with our sister company HOSOKAWA MICRON BV, we supply mixing solutions which are convincing both in terms of technology and economy.

THE CYCLOMIX HIGH-INTENSITY MIXER:

The mixer is fed via special weighbelt feeders. Generally speaking, there are three feed units, one for toner and one each for the additives. The metering precision – especially of the additives – sets extremely high demands because it is usually only a few grams which need to be added.

In the mixer, the toner particles are coated with the additives according to a fixed sequence in order to achieve the desired properties. The most important criteria here are the mixer size, the design of the mixing elements, the speed, the mixing time, and the batch temperature.

The new Cyclomix is a high-intensity mixer that combines shearing action with the proven advantages of an impact mixer. It has been designed specifically for post-additive blending in toner systems.
Its conical design in combination with paddles rotating at high speed creates intense shear forces and rapid homogenisation. The shear force is ideal for evenly distributing charge control agents and silica onto the toner particle. The entire vessel is jacketed so heating or cooling can be precisely controlled right at the heat transfer area. Discharging the finished product is simple thanks to the mixer's conical shape.
Product change with the Cyclomix is made easy by virtue of its extremely accessible design. Quick-release clamps are located on both the cover and discharge valve. Once the clamps are removed, the entire cover with rotor can be lifted hydraulically at the push of a button.

FLEXIBILITY

The Cyclomix can be supplied with high polishing qualities such as 220 grit and electropolished for even easier cleaning. The cover as seen on the 50 L Cyclomix lifts upwards to open. For larger sizes, the cover can be mounted at floor level and the vessel lowered onto it hydraulically.

Cyclomix model	1	5	50	150	250	500	1000	2000
Motor power [kW]	1.1	3-5.5	15-30	22-55	37-75	55-110	110-220	160-310
Product volume [l]	0.3-1	1.5-5	15-50	45-150	75-250	150-500	300-1000	600-2000

WORKING PRINCIPLE CYCLOMIX

KEY FEATURES

- 1-litre laboratory mixer to 2000-litres production mixer
- Exceptional heating and cooling capabilities
- Perfect discharge of material
- Hydraulic opening mechanism
- Bearings in top cover have no contact with the product
- High-shear rotor with the added knife blade option for impact action

The product is filled from the top into the conical mixing vessel and the main motor drives the high-speed rotor. The shaft is equipped with blade-shaped mixing elements which rotate close to the inside vessel wall. Due to this and the conical design, the bulk material is transported from bottom to top. In the upper zone there is an inwards and downwards movement which leads to quick macromixing. The moving blades accelerate the particles which are thoroughly mixed through friction at the tank wall (micromixing).

SAFETY SCREENING

Downstream of the mixer, the finished toner is fed to a protective screening machine such as the Allgaier TSM screen with ultrasonic cleaning device. This ensures that the toner which comes onto the market is free from any lumps which could possibly form during the pneumatic transport.

To ensure a high degree of quality at simultaneously high screening efficiency even with the finest mesh widths, Allgaier equips its TSM screening machines with an ultrasonic system. By introducing a high-frequency vibration into the screen fabric, friction and adhesion forces in the product that are overcome, thus resulting in trouble-free screening. Sound propagation across the entire screen surface ensures that no product remains to clog the screen fabric, even with extremely large-surface screens.

WITH ULTRASONIC CLEANING DEVICE

ALLGAIER TSM SCREEN

POWDER AND PARTICLE PROCESSING ACCESSORIES

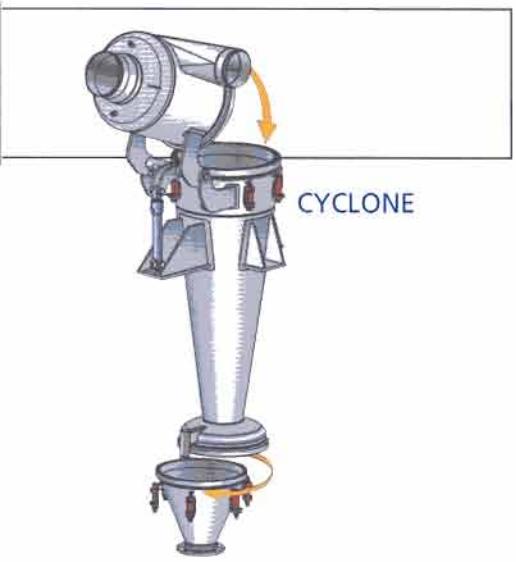
HOSOKAWA MICRON

CYCLONE

The ALPINE® High-Efficiency Cyclone is characterised by an extremely high collection rate at low pressure drop.

FEATURES:

- High collection rate up to 99%
- Finish-turned flange with no gaps, O-ring
- Hydraulic opening mechanism for quick and thorough cleaning
- Excellent surface finish polished to Ra = 0.8 µm
- Graduated product line to accommodate the respective air flow rates
- Design options: mild or stainless steel
- Explosion-pressure-shock-proof design to 10 bar overpressure or pressureless



CYCLONE

AIR JET SIEVE

Analysis sieving machine with modern equipment for extremely accurate, reproducible sieving analyses in the laboratory.

AIR JET SIEVE

FEATURES:

The extraordinarily good dispersion of the product brought about by the nozzle jet permits analysis down to 10 µm with micro-precision sieves.

- Analysis range
  20 µm to approx. 4000 µm
  with 203-mm diameter analysis sieves.
  10 µm to 30 µm
  with 75-mm diameter micro-precision sieves.
- Fully automatic sieve identification

LABORATORY CLASSIFIER 100 MZR

Simple in operation, this laboratory classifier is characterised by a high precision of cut for high quality demands in the field of particle analysis.

FEATURES:

- Separating range d97 = 2 – 80 µm
- Suitable for materials up to Mohs' hardness 5
- Throughput: batches from approx. 50 g
- Max. feed rate approx. 2 – 6 kg/h (batch mode)
- Simple to clean

LABORATORY CLASSIFIER 100 MZR

ON-LINE PARTICLE ANALYSIS WITH INSITEC ANALYSIS SYSTEM

Fully automatic optical analysis system for particle size and particle concentration analyses for dry powders

FEATURES:

- Analysis principle: laser diffraction.
- Partial-flow sampling from the main product stream using a bypass.
- No longer necessary: time-consuming sampling, sample transfer to the laboratory and downstream handling.
- Also suitable for automatic fineness control using a continuous signal as the control parameter.
- Encapsulation provides dust and splash-water protection.
- Product-contact parts in stainless steel.

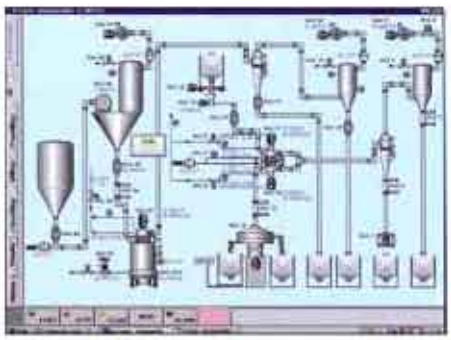
INSITEC ON-LINE PARTICLE ANALYSIS

STOTT® FILLING AND WEIGHING SYSTEMS

In view of the varying requirements for product isolation and operator protection, Hosokawa Micron UK has developed a range of equipment and integrated system options to meet the containment criteria demanded by the toner industry.

Accurate weight-controlled filling systems designed and manufactured to maintain the highest standards of hygiene, dust control and product integrity.

Laminar Flow Booths
A controlled, once-through non-turbulent air flow ensures good operator protection from dust and fumes.



PROCESS CONTROL SYSTEMS

Thanks to the advances made in the field of electronics, it has been possible to continuously refine the complex control units supplied for the toner systems. Today, we predominantly use switch cabinets and control systems with visualisation options. Process steps, flowcharts and actual values are displayed clearly on PLCs, and the operating status can be monitored and retrieved at any time. All error messages are registered and can also be printed out at any time.

CONTAINMENT LEVEL1
(500 - 1000 µg/m³)

CONTAINMENT LEVEL 2
(100 - 500 µg/m³)

POWDER AND PARTICLE PROCESSING

TONER PROCESSING – THE LATEST TRENDS

As an option to toner manufactured in the conventional way, the latest trend is towards toner made chemically by means of polymerisation.

VRIECO NAUTA®
VACUUM DRYER

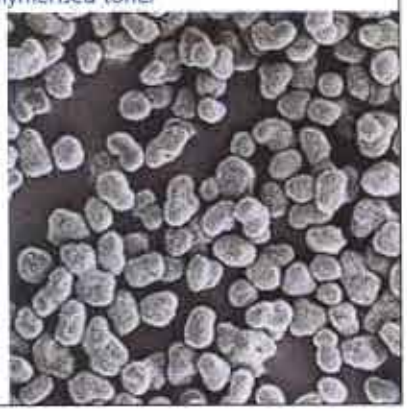
This results in the following process and quality advantages:

- Finer and more closely defined particle size distributions
- Improved homogeneity
- Manufacture of functional particles possible
- Improved colour characteristics and transparency
- Controlled particle shape

We at HOSOKAWA are also well-equipped to meet this new challenge. On the one hand, we use the vacuum dryer to gently dry the suspension, and on the other hand, the TTSP Tandem Toner Classifier is capable of manufacturing three fractions in one single process step, i.e. both the top-size particles and the superfine portion can be classified simultaneously.

Conventional toner

Polymerised toner



MIXING

The Cyclomix is ideal for the blending process required here.

DRYING

Chemically produced toner has to be dried after the polymerisation step. A considerable amount of water can be pressed out of the product by means of mechanical dewatering, however, a second step should be used to remove the last traces of moisture. The Vrieco Nauta Vacuum Dryer is the ideal solution for this step. Heat is transferred into the product essentially through a jakketed vessel wall which causes moisture to evaporate. A rotating screw orbits along the vessel wall and helps the vapour to escape to the surface, providing at the same time a frequent exchange of particles in contact with the heated surface.

A vacuum system keeps the vessel under constant vacuum and removes the vapour from the vessel, having separated the dust particles from the vapour first in a dust filter on top of the vessel. The vacuum conditions within the vessel reduce the saturated vapour pressure of the moisture and this makes drying at much lower temperatures possible.

HOSOKAWA Vacuum Dryers are built as totally enclosed systems and when operated under full vacuum, offer the following features:

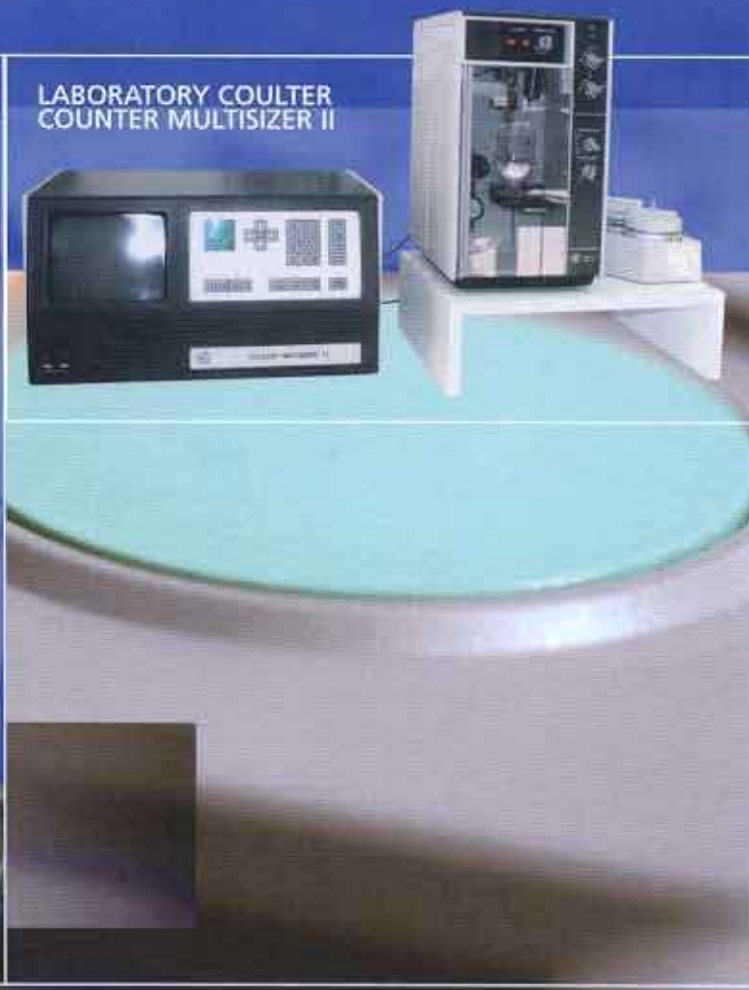
- Low energy consumption
- Gentle to the product
- Good heat transfer rates
- Fast drying times

The dryers range from 5 litres capacity up to 12 m^3 – larger models on request.

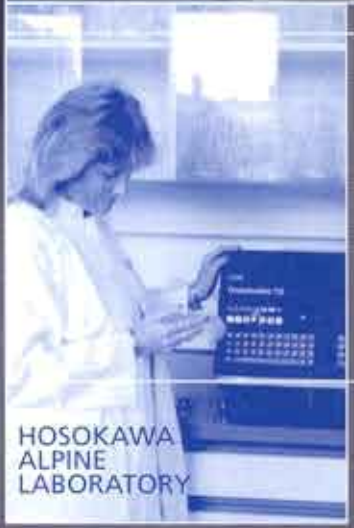
APPLICATION TESTING CENTRE

In most cases, the design of a toner system is based on tests. Although such tests are extremely complex and time-consuming, and furthermore demand a wide range of available plant and machinery, it is the only way to guarantee an optimum machine combination. Skilled and highly qualified engineers with years of experience carry out these tests at HOSOKAWA. Once the test series is complete, our customers can be assured that the right machine combination has been found. Our testing centres are equipped with a wide range of grinding and classifying systems, not only production-size systems, but also laboratory and pilot plants. Annexed to the testing centre is a highly modern laboratory equipped with exactly the same kind of measuring and analysis equipment which the customer will use later for purposes of quality assurance. To ensure accurate baseline data, the test systems must always be state of the art, which is why we constantly renew and add newly developed machines to our stock of machines and equipment. One of the newer machines is the 200 TTSP classifying system shown in the figure, which has been available for classifying trials since early 2001. The test system is characterised by a high degree of flexibility, this especially with regard to the gravity feed unit and the entire control and measuring technology needed to set the required operating parameters. All the operating data of this system can be recorded so that the test results can be documented in their entirety.

200 TTSP
CLASSIFYING SYSTEM
IN THE TESTING CENTRE



LABORATORY COULTER
COUNTER MULTISIZER II



HOSOKAWA
ALPINE
LABORATORY

HOSOKAWA MICRON GROUP

WORLDWIDE

PROCESS TEC

The HOSOKAWA MICRON GROUP is an international supplier of machines, systems, processes and services. Based on this comprehensive performance range, HOSOKAWA offers process solutions for a great number of different business segments:

1. POWDER AND PARTICLE PROCESSING

HOSOKAWA is the world's largest provider of processing systems for the field of powder and particle processing. Renowned names such as ALPINE, Bepex, Stott, Vitalair, Rietz, Mikro, Micron, and Vrieco-Nauta are all included in the Group's range. Regardless of the size, i.e. production-scale systems, pilot systems or laboratory equipment, HOSOKAWA's products and technologies are used in numerous process stages, for example during comminution, mixing, drying, agglomeration, classification, weighing and metering.

2. BLOWN FILM PROCESSING

HOSOKAWA ALPINE is one of the world's foremost suppliers of film blowing systems. As a one-stop shopping partner, Alpine supplies complete systems for the manufacture of blown film, from granule feeding systems to film winders, from single-layer die heads to 7-layer lines, and from simple speed regulators to state-of-the-art process control systems. And with ALPINE's own film orientation lines, complete systems are now available which facilitate film upgrading and enhancement processes.

3. CONFECTIONERY & BAKERY TECHNOLOGY

The vast fund of know-how built up by the Bepex, Kreuter and Ter Braak companies over many long years makes the HOSOKAWA Confectionery and Bakery Group the ideal partner for the confectionery industry. A complete range of machines and production systems is available or can be custom-designed for each process step, from preparation of the raw materials and confectionery pastes to the end product.

The group maintains facilities for research, engineering, manufacturing and service in each of the world's major industrial markets.

Osaka / Japan

Augsburg / Germany

CHNOLOGIES FOR TOMORROW℠

HOSOKAWA – powder and particle processing for the toner industry – worldwide

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HOSOKAWA MICRON GROUP

The Hosokawa Micron Group will always be the leading global company covering the multi-faceted range of powder technologies. The group will achieve peaks of excellence in the development and commercialisation of advanced materials, process equipment and systems engineering.

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