

SIZE REDUCTION TECHNOLOGY



HOSOKAWA ALPINE **Compaction**

A Division of HOSOKAWA ALPINE Aktiengesellschaft

HOSOKAWA Alpine

Size Reduction Technology

Process Solutions for Granulation Requirements



Alpine offers a variety of techniques tailored to meet the requirements of your business.

- Pharmaceutical**
- Food**
- Chemical**

Our technology increases and homogenizes the bulk density of materials, breaks down agglomerates and flakes from roller compaction or other processes. Granulating these by-products improves flow properties.

Materials of Construction, Finishes

Although all of the product contact parts of the BEXMILL ABM series and the Flake Crusher AFC series are constructed from stainless steel, you can request custom construction from other materials such as Hastelloy. The Pre-Crusher APC series can also be constructed from carbon steel.

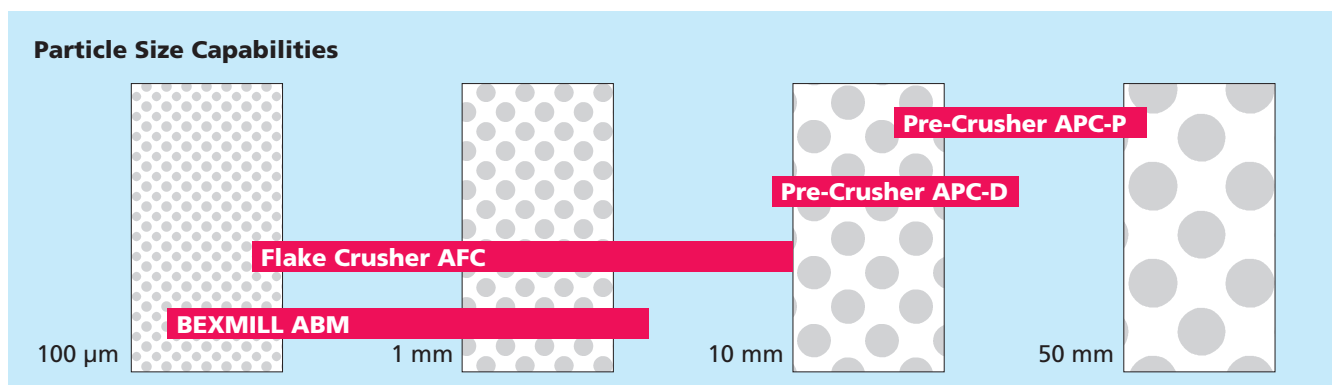
The following finishes are available:

- Ceramic linings
- Brush finished
- Mechanically and electropolished

Controls and Drives

Alpine also offers several options for the control of these machines. Your choice range from manual speed controls through to variable speed drives for precision motor adjustment with integrated feedback loops. Standard electrical construction is NEMA 4X.

The machines are suitable for ATEX zones 1 and 21





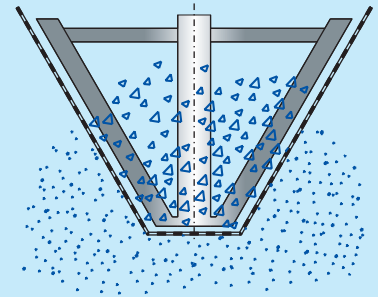
BEXMILL ABM

Flexible, gentle processing

- Easy clean design
- Conical mill design
- Vertical rotor
- Large inlet opening
- Minimal airflow

Applications

- Homogenization of particles
- De-agglomeration of agglomerates
- Grinds oversized particles
- Improves flow characteristics
- Granulates roller compacted material
- Downstream of mixers, dryers and fluid bed dryers
- Prior to packaging equipment



Pages 4 - 7

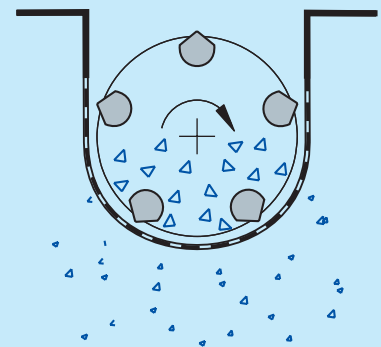
Flake Crusher AFC

Fine, but not too fine

- Horizontal mill rotor
- Cylindrical rotor design
- Cage supported screen

Applications

- De-lumping
- Granulates flakes
- Homogenization of powders
- Granulates soft to medium hard materials with a definite top size



Pages 8 - 9

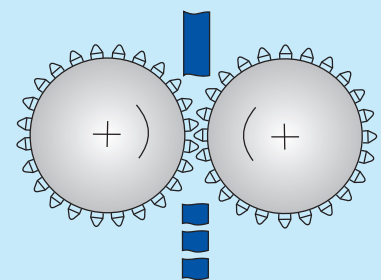
Pre-Crusher AFC-P / AFC-D

Ideal for preparing material

- Synchronous counter-rotating rolls
- Pin or disc breaking device
- Low energy consumption

Applications

- Performs first size reduction step prior to fine grinding
- Dustfree size reduction
- Flake breaking
- Creates free flowing material from lumps



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Services

- Technical testing center
- Customer site visits and seminars
- Manufacturing
- Research and design
- Systems design
- Feedback and control systems
- Automation Validation

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Technologies

- Compaction
- Briquetting
- Granulation
- Size reduction of granules
- Pelletizing
- Extrusion
- Spheronization

Product Types

- Flakes
- Granules
- Briquettes
- Pellets
- Spherical granules

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BEXMILL ABM

High Capacity and Versatile Production



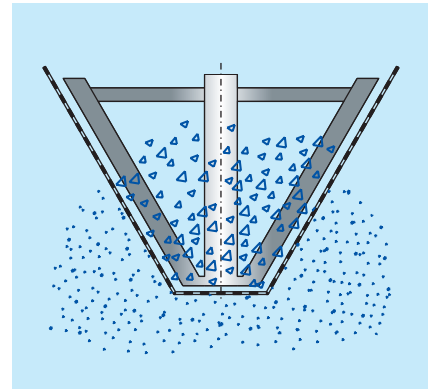
The BEXMILL ABM series offers you a variety of production capabilities. Our machines can handle both small laboratory requirements and large production rates of up to 8 tons per hour.

Because our machines are versatile, they can be delivered with many accessories and in different configurations. For example, machines are available in both portable or stationary designs.

The BEXMILL can be operated in a continuous or batch process. Granulation takes place between the conical rotor and screen. Soft to medium hard flakes in a variety of sizes can be granulated in one pass.

Your required particle size can be achieved using a variety of interchangeable screens. This gentle size reduction avoids product damage and generates a minimal amount of fines.

You can change screens quickly without any tools to avoid costly downtime. Either way, the BEXMILL maximizes process effectiveness while reducing process costs.

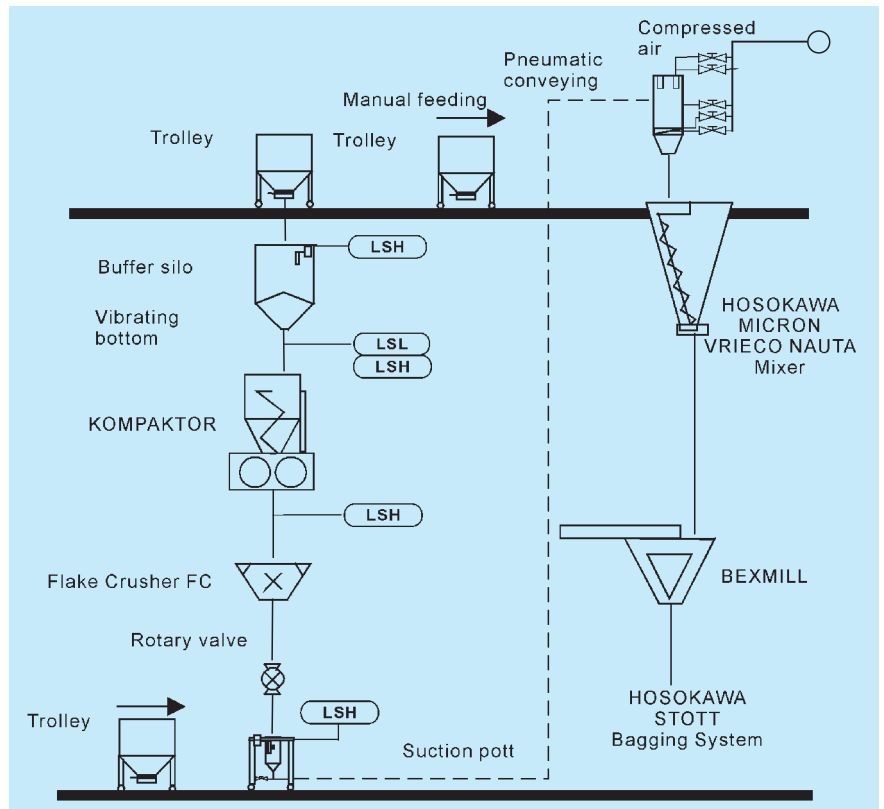


Hosokawa Alpine technology is more than granulation and agglomeration technology. We offer complete technical solutions from product feeding through to packaging. We can plan and manage the entire project from conception through to training.

Technical Data

Model	Drive kW	Through put kg/h Min. / Max.
ABM 150	1,5	20 / 200
ABM 200	4,0	100 / 1000
ABM 300	7,5	500 / 4000
ABM 400	15,0	1000 / 8000

Plant for the production of pharmaceutical granules with a maximum granule size



BEXMILL ABM

Easy Clean Design

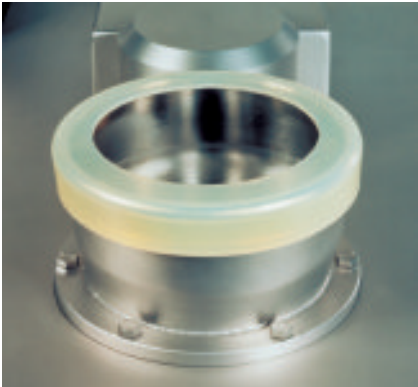


The combination of the rotor speed and screen selection determines the final particle size distribution (a, b). The critical gap between the rotor and screen can be adjusted manually or automatically. The rotor is designed for long life and maximum performance. Rotor seals are also available with air or Nitrogen purging.

The BEXMILL is the perfect machine for your GMP facility to process pharmaceuticals.

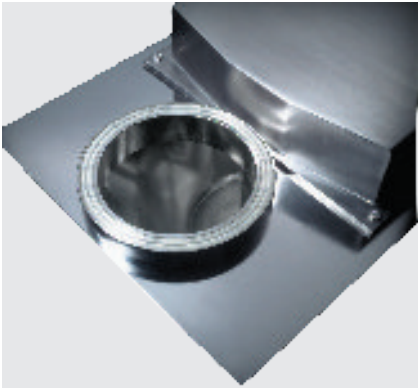
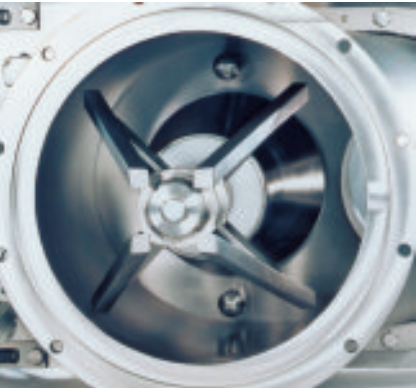
All product contact gaskets and seals use FDA approved materials.

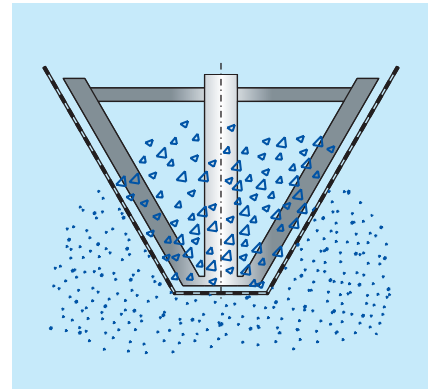
Each unit can be custom designed to accommodate a wide variety of upstream and downstream connections. For example, inlets and outlets of the mill can be designed with beaded collars, tri-clamp connections, or vacuum connections (c).



Product contact areas can be washed using CIP systems (d).

A telescopic outlet (e) can be used for inline fixed installations. The telescopic transitions are flanged to the mill for a dust tight seal. All flanges are machined. Silicone gaskets are used between flanges. The design eliminates the need for a fixed pipe system between components. It also facilitates the screen changing process.





Mill Screens

- Round hole
- Rasp
- Square hole
- Rectangular

Screen hole sizes of 0,5 to 10 mm



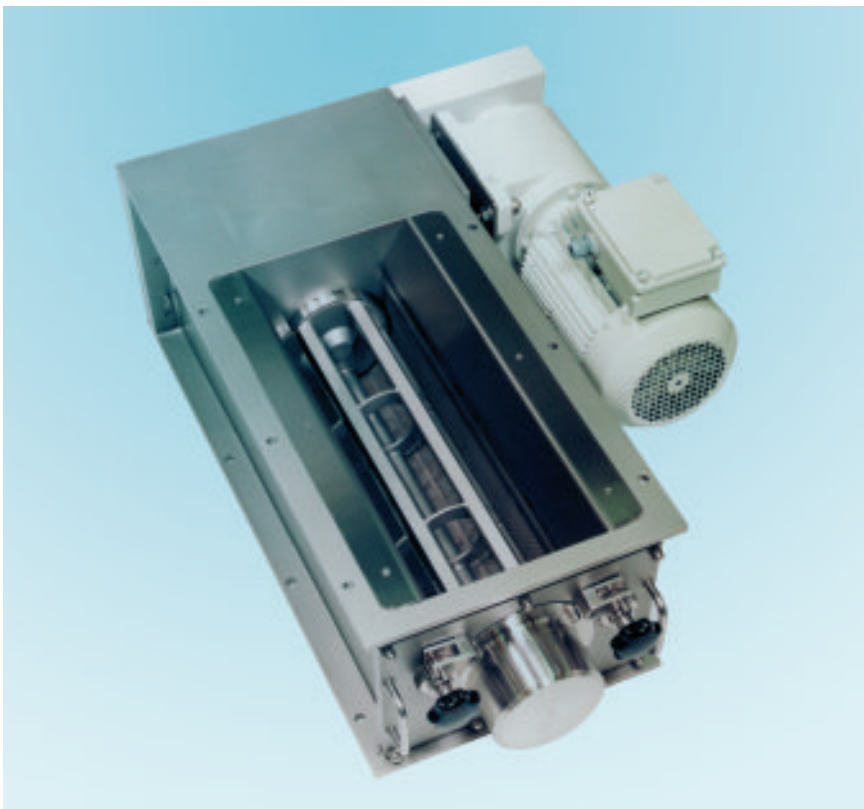
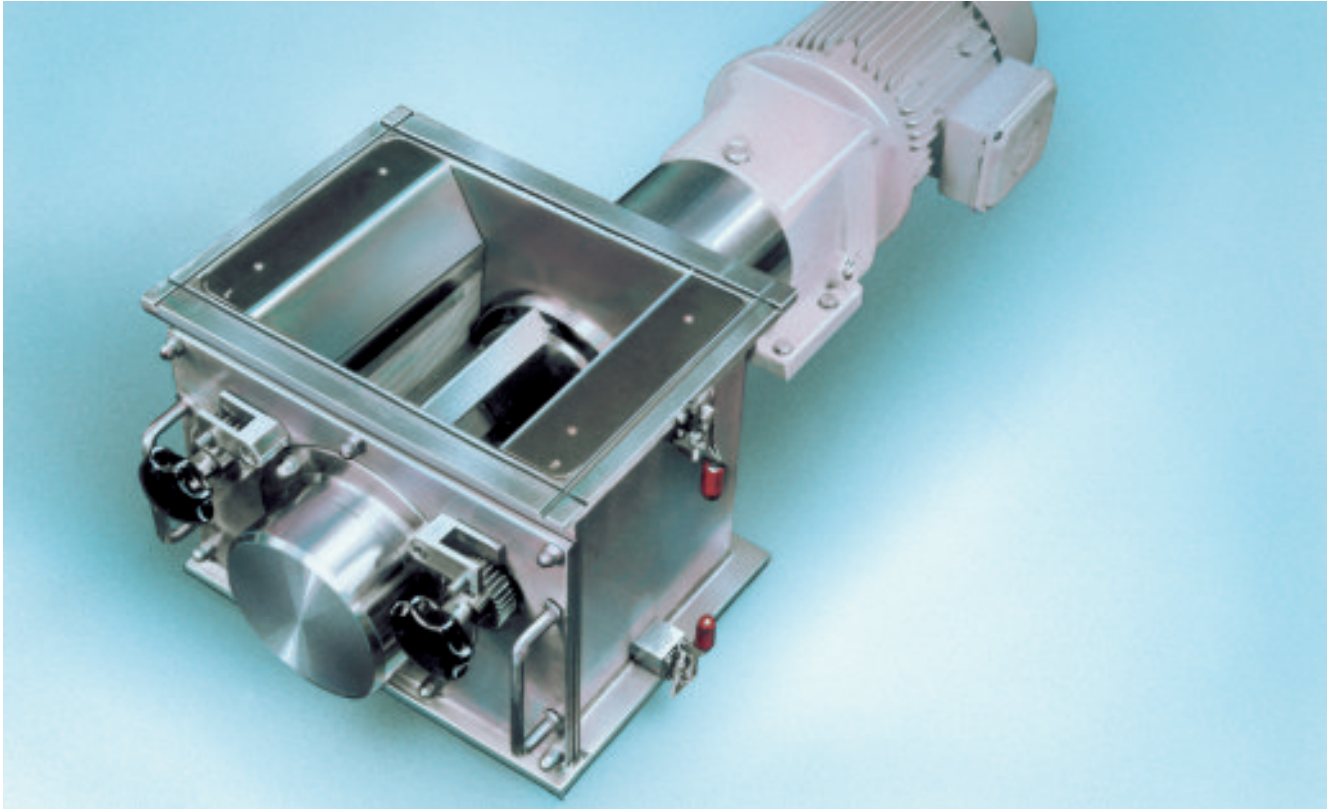
Mill Rotor

- 2-arm-, 3-arm-, 4-arm-, 5-arm-rotor
- Round profiled rotor arms for moist product
- Edge profiled rotor arms for dry products
- Exact rotor gap adjustment



Flake Crusher AFC

Fine, but not too fine

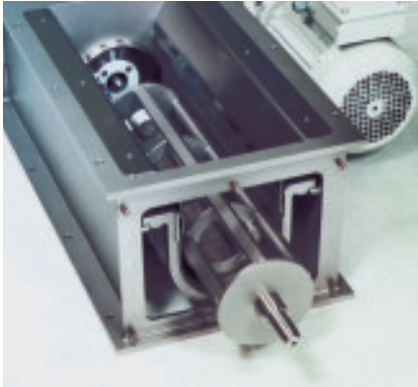
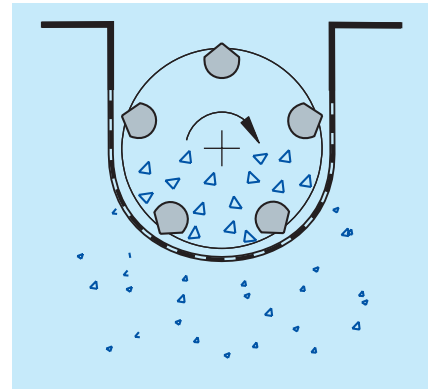


Principle of Operation

The rotor cuts the material through a screen surface using a rasp screen or a hole screen. The throughput, particle size range and crushing intensity are governed by the rotor speed, while the upper limit of the particle size is dictated by the screen. Final screening of the product to remove oversized material is not necessary.

The Construction

The rotor is installed in a dust-tight welded casing. The screens are fastened to a supporting basket. Two eccentric cam tensioning devices allow adjustment of the screen basket relative to the rotor for maximum grinding efficiency and screen life.



Disassembling and Cleaning

All parts in contact with the product being processed, including the rotor, screen with basket and cam tensioning devices, are easily disassembled from the front. Cleaning and disassembly can be done in a few minutes without the need for removal of the Flake Crusher from the process.

Connection with Other Equipment

The Flake Crusher makes a dust tight connection with other equipment in the operation.. For cleaning only the quick-acting clamping device is opened. The Flake Crusher is moved to the front, out of the operating area, on rails.

Accessories

The Flake Crusher AFC can be equipped to suit each individual application.

- Feed and discharge hoppers
- Flanged connections
- Air purged seals
- Track beam version
- Dust exhaust connections
- Mounting stands with rollers
- Hopper with safety grid for manual feeding
- Screen hole sizes of 0,8 to 8 mm

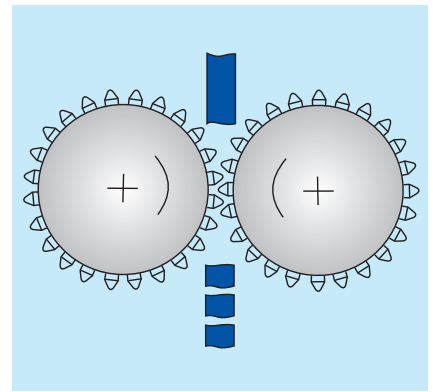
Technical Data

Model	Drive kW	Throughput kg/h	
		Min.	Max.
AFC200	0,75	50	500
AFC300	1,1	75	750
AFC400	1,5	100	1000
AFC500	2,2	125	1250
AFC600	2,2	150	1500



Pre-Crusher AFC-P / AFC-D

Low Energy - High Yield



Principle of Operation

Materials drawn in continuously through the two synchronous counter-rotating rolls. The peripheral speed is set to match the throughput. A very low grinding energy consumption, as well as the synchronous speed of the rolls assures a nearly dust-free crushing process.

The Construction

All Pre-Crushers APC use a welded casing with external bearing design for low maintenance and high reliability. Various materials of construction are available depending on the application. The separately driven crusher rolls utilize an electric drive without the need for gearing.

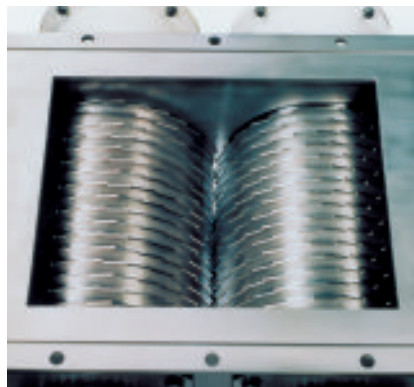


Crushing Roll Design Pins (Model APC-P)

- The design employing wear resistant pins is used for the prebreaking of thick flakes and coarse feed material. The material is crushed into pieces approximately 20 to 30 mm.

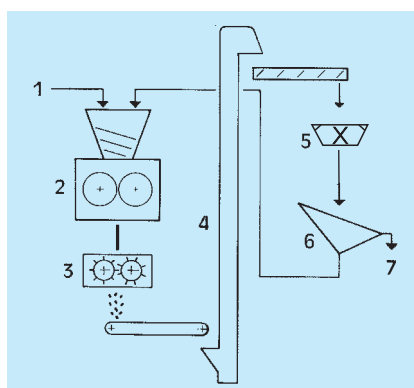
Discs (Model APC-D)

- The design employing discs is used to crush thinner flakes to a final size of less than 5 to 15 mm.
- Hardness of pins
- Shape of laser-cut discs
- Requirement of hardfacing
- Crusher gap
- Types of materials of construction

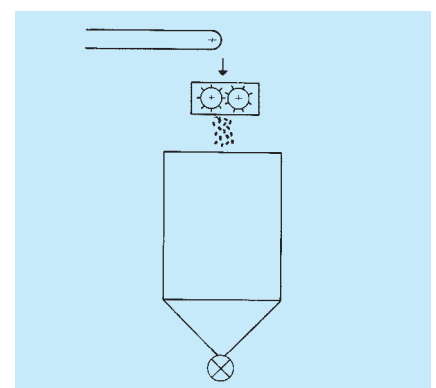


Technical Data

- Roll diameter 300 mm
- Working width 200 to 800 mm
- Drives 2 x 1,5 to 2 x 4,0 kW



1. Basic material, 2. Compactor,
3. Pre-Crusher APC, 4. Bucket elevator,
5. Fine breaker, 6. Screen, 7. Granules



HOSOKAWA Alpine Technology

... More Than Just Machines

The HOSOKAWA Alpine Test Center

Extensive know-how is available in the Hosokawa Alpine test center to provide technical and economical solutions.

Customer tests are performed daily in our testing facilities - a laboratory for pharmaceutical applications as well as a test center providing both the complete machine equipment and a pilot plant used for scale-up of processing plants. Our analytical lab can quickly analyse the product. The results of our tests are not only the production of samples or machine configurations but also an individual system design and complete process engineering for your needs.

Development and Design

To accommodate our technology to your application we use modern CAD and our own fabrication. We develop and manufacture new machines, plants and processes to be able to produce granules with specially tailored properties. Due to the intensive and worldwide cooperation especially with sister companies and research institutes we have a high development potential at our disposal, which we can offer for your application.

Validation

We can validate both machines and plants according to your given standards (IQ and OQ validation).



Control and Automation

Process Logic Control (PLC) is standard and can easily be interfaced with other main process control and data logging systems on your plant. Our COMPACT CONTROL enables process automation and visualisation including process monitoring, data gathering and diagnosis of errors.



HOSOKAWA ALPINE

Agglomeration Technology

We bring your powder into shape



HOSOKAWA ALPINE Compaction

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The ALPINE Technologies

Machines and complete plants for

- Compaction
- Briquetting
- Granulation
- Size reduction
- Pelletizing
- Extrusion
- Spheronization

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