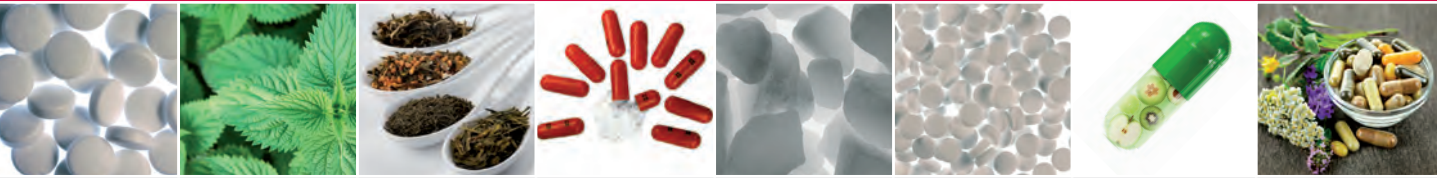


# Roller compactors for the pharmaceutical industry

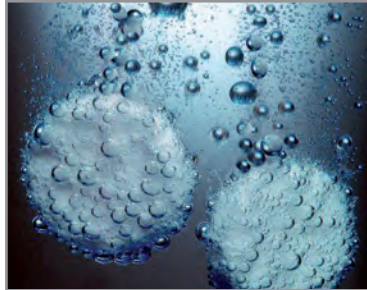
BT 120 Pharma • WP 120 Pharma • WP 150 Pharma • WP 200 Pharma



# Roller compactors for the pharmaceutical industry

## Compaction and granulation in the pharmaceutical industry

Three-quarters of pharmaceutical formulations are administered in solid form such as tablets or capsules. Beside the active ingredients the different recipes include a wide range of different excipients and additives (fillers and flavoring). Because of the different raw material properties, the fine powder mixtures cannot be pressed directly to finished drugs in a tablet press. Instead, it is necessary to compact and granulate the powder in advance.



With both processes the physical properties (granule size, granule particle distribution, bulk density, granule hardness and active surface) can be influenced so that the powder can be processed to the final product very accurately and economically. Compared with powder, granules are characterized by a greatly improved flowability and higher density (volume reduction).

### This provides the following advantages:

- accurate and precise dosage
- reduction of health hazards by reduction in dust formation at the workplace
- increase of machine life time through reduction of dust formation
- possible positive influence to the dispersion and solubility characteristics
- homogenous distribution

### Examples of granules:



Riboflavin



Sodium bicarbonate



Lactose



Antibiotics

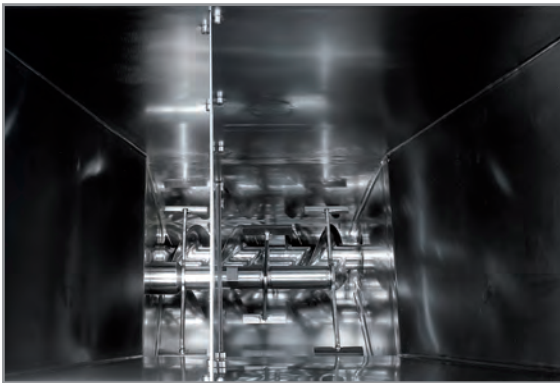
### Applications

For many years pharmaceutical companies as well as specialized providers all over the world have been using solutions supplied by Alexanderwerk to produce tablets, capsules, life science products, flavours, instant powders, intense sweeteners and many more.

The processing principle of roller compaction and granulation is relatively straight forward. However, only the use of modern production technology in connection with highly-developed feeding and control technology enables an accurate and economic production of high quality roller compacted and granulated products, which meet pharmaceutical requirements.

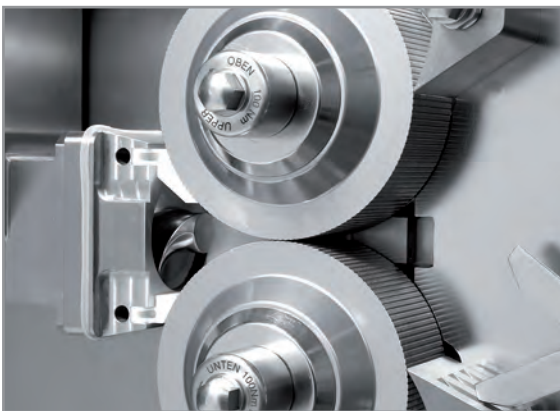
Granulation using roller compaction is commonly known as dry compaction. This process avoids the requirement for additional binders or liquids, which are necessary in the wet granulation process, and as a consequence of the wetting process a drying phase is also required. Since no wetting takes place in roller compaction the product is not subject to chemical reactions or high temperature drying. In addition the benefit of reduced environmental impact is achieved by dry compaction. The compaction of the materials is realized by high mechanical pressing forces, which provide the production of a compressed ribbon.

The high quality of the final product is determined by the compaction process and is achieved in three consecutive steps:



### **1. Feeding**

Using a suitable feed-in system, the raw material (powder) is routed through a horizontal screw feeding section. This has the function to provide the product precisely dosed, constantly and accurately to the rollers.



### **2. Compaction**

The powder is compacted between two rollers to a homogenous solid flake, whose bulk density is significantly higher than the bulk density of the bulk material. The air, which is displaced during compaction, must be allowed to leave the process properly.



### **3. Granulation**

The flakes, which were produced through the compaction process, are granulated using a suitable single or multistage granulation system. In this way, granules are created to the defined granule size required.

## Why Alexanderwerk?

### Vertical roller arrangements

Instead of using a plug screw, Alexanderwerk works with a vertical roller arrangement, which allows greater control of feed flow without the influences of gravity. Moreover, side seal losses can be separated from the compacted material and can be added back to the raw material, if required. This leads to a minimization of fine material in the finished product without having any negative influence on the consistency and composition of the batch.

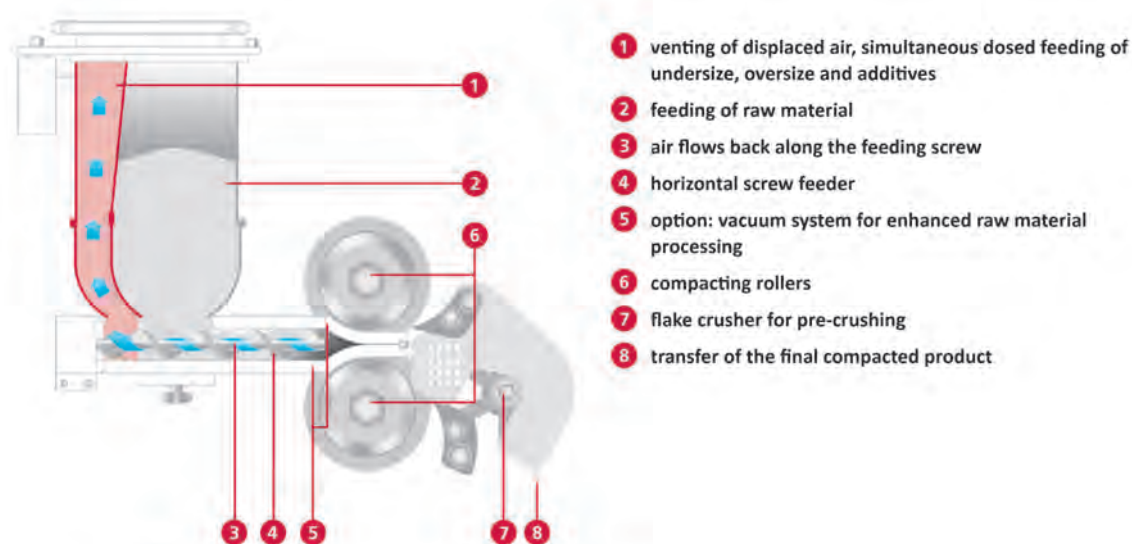
### Combi-Vent-Feeder®

When using roller compactors, it is generally accepted to use a screw feeding system for feeding raw material. As well as requiring the highest quality in the final product, our customers are also looking to achieve financial targets (improved cost per tablet). To support our customers with the best possible solution, Alexanderwerk has devoted itself to the optimization of the feeding system and so has developed the patented Combi-Vent-Feeder®.

Through feeding using the patented Combi-Vent-Feeder®, the air, which is displaced during the compaction process, is allowed to escape properly through a second chamber of the feed hopper without disruption of the feed. This leads to a uniform feed of raw material into the rollers. Furthermore, the second chamber can be used to recycle undersize and oversize granule, which can be homogenously added to the raw material, if required. In addition, the feeding unit can be assisted by using a vacuum system, which provides a minimal product layer on the inside of the screw housing.

This provides the following advantages:

- direct positive influence on the compaction
- defined, reduced resistance venting of the product through the screw housing and through the “clear” smaller chamber
- constant quality of flakes and granules
- gentle process both in compaction and granulation units
- protection of the sealing between screw shaft and housing
- simple control of raw material feeding



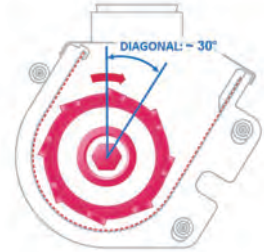
Optimized feed through the Combi-Vent-Feeder® technology illustrated on the example of a WP 200 Pharma

## Two-stage granulation in Diagonal-Design®

Rotor screen granulators are commonly used in the chemical, food and pharmaceutical industry for sizing of soft to medium hard products.

Conventional designs consist mainly of a rotor with angled granulating bars, which run in a U-shaped frame and push the product through a supported screen mesh or perforated plate. The rotor pushes the lumpy product against the screen mesh, so that the final product is smaller than the perforation of screen being used.

In comparison Alexanderwerk has developed a patented granulator in Diagonal-Design®, which raises the capacity up to 100 % by increasing the effectiveness of the working area of the screen. This leads to a doubling of throughput and in turn to a very gentle granulation with minimal fines generation. Additionally investment costs are reduced and the quality of the final product is increased.



## All-round support

Beginning with the manufacture and followed by delivery, installation supervision, implementation, maintenance and on-site assistance – Alexanderwerk is at your service.

## Keeping at the forefront of technology

The processing of pharmaceutical products places extremely high demands on the techniques used and must often be linked with individual and innovative solutions. For many years international pharmaceutical companies have been relying on the planning, construction and production of our advanced machines and customized designs as well as on our individual adaptations. In addition, we can also support our customers in the area of plant construction. To offer the best possible solution for our customers, we provide the combination of our own and third-party components from a single source.

We are ready to face the challenge!

## Trial/Test center

To guarantee the optimal processing of each product, Alexanderwerk offers its test center for different tests and process developments. This can be done in the presence of the customer as well as independently through Alexanderwerk. In both cases the customer is given a detailed test report to provide a better basis for further decisions.

Please feel free to contact us – we will be pleased to support you!



## Alexanderwerk: The Compaction People

Alexanderwerk is a world leader in producing advanced compaction and granulation solutions for the pharmaceutical and chemical industry. For over 125 years Alexanderwerk has been dedicated to its customers and offers a wide range of custom made solutions. From stand-alone equipment to complete integrated, state of the art compaction plants – we aim to exceed our customer expectations by meeting the markets growing demand for higher quality and higher performance equipment.

*So, whatever you need, just ask the people behind the technique.*

## Alexanderwerk roller compactors for the pharmaceutical industry



### Compaction machine

#### Roller compactor BT 120 Pharma

With the BT 120 Pharma, Alexanderwerk offers a roller compactor, developed for research and development within the pharmaceutical industry. This provides an integrated design that exactly replicates the process of the production machines to determine the feasibility of compaction on a compact unit. With a throughput of up to 8 kg/h (Lactose), the machine provides an excellent approach to determining scale up to other Alexanderwerk roller compactors.



### Laboratory and pilot production machine

#### Roller compactor WP 120 Pharma

With the introduction of the WP 120 Pharma, Alexanderwerk offers a roller compactor designed to meet the highest requirements and standards in pharmaceutical research and development as well as pilot production. On this machine small amounts of as little as 5 g to a maximum up to 50 kg/h (Lactose) can be processed into granules of varying sizes. This enables realistic and fully controlled production conditions when processing special products, producing small batches in the laboratory or pilot production batches.



### Compaction and granulation machine for containment

#### Roller compactor WP 150 Pharma

Beside production of standard products with a capacity up to 250 kg/h (Lactose) the WP 150 Pharma with its advanced sealing system has been specially designed for improved product containment. This makes the WP 150 Pharma roller compactor ideally suited when it comes to compacting or granulating potent preparations.



### Compaction and granulation machine

#### Roller compactor WP 200 Pharma

The Alexanderwerk WP 200 Pharma is especially designed as a production model, which meets the highest requirements and standards of the pharmaceutical industry. With a throughput range of 10 up to 500 kg/h (Lactose), the compactor can be used for the production of a large range of products in small batches due to its excellent cleaning and quick product changeover features or alternatively for the compaction and granulation of single products in a continuous round the clock operation.