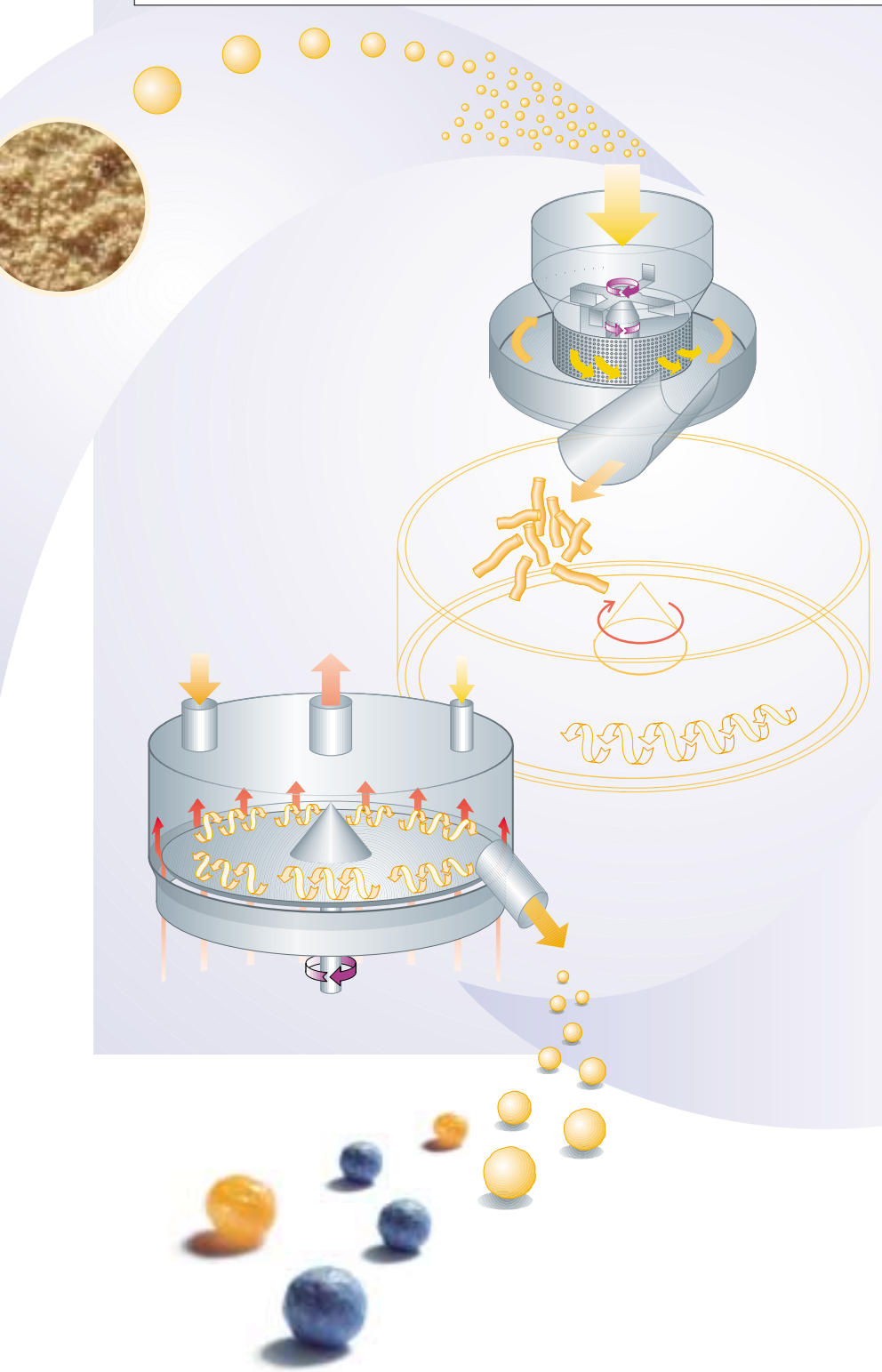
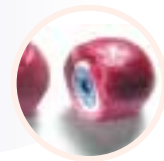


Extruder • Spheronizer • Pelletizer



- Extruding
- Pelletizing
- Spheronizing
- Powder Layering



We set the standard

Extrusion Pellets Technology

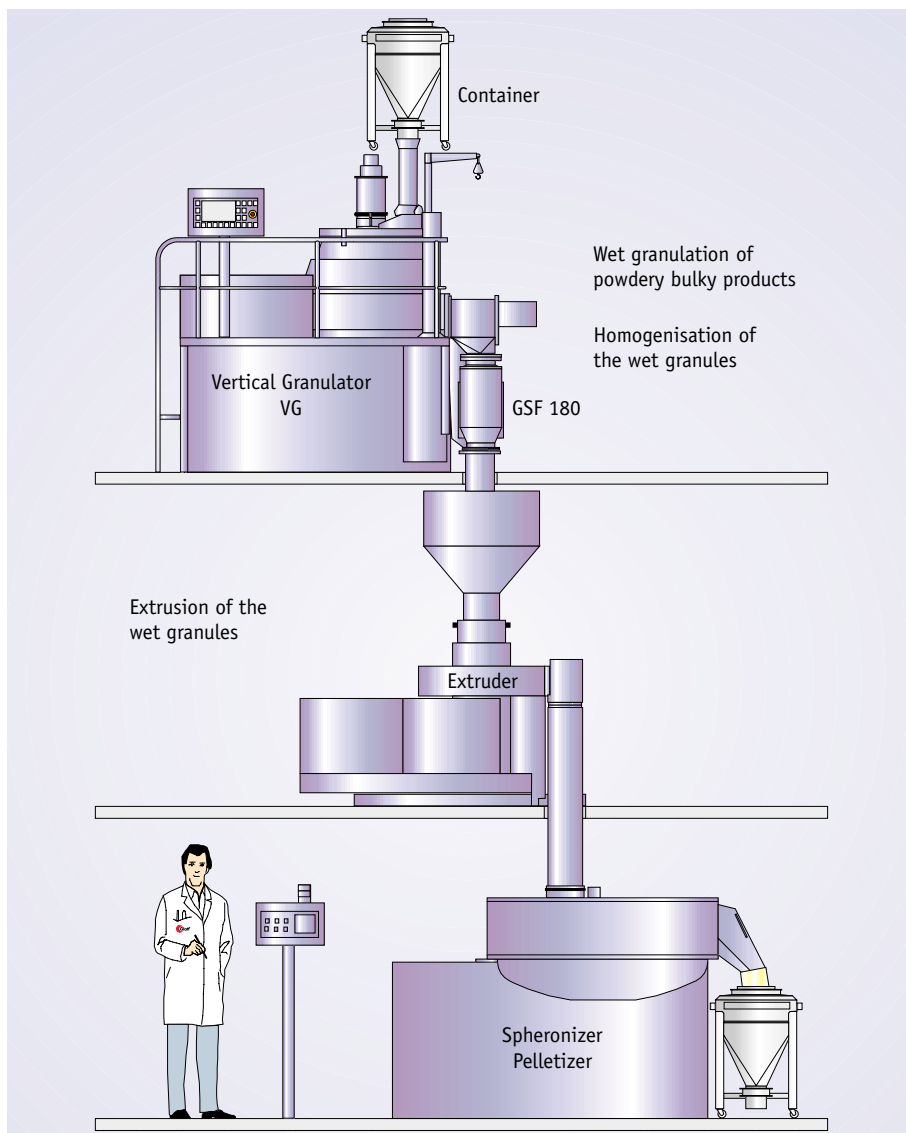
Extrusion pellets for various applications

Pelletizing lines with extruder and pelletizer units are in demand whenever wet powders and/or granulates are to be converted into oblong, cylindrical and/or spherical extruding pellets. Pellets with a compact structure, which are depending upon composition dispersible or well in liquids soluble, offer many advantages for process engineering:

- Reduced dust concentration and product deposits
- Clearly improved flow characteristics of the finished product by even forms with smooth surfaces
- Improved bulk material characteristics for handling and processing
- Good solution and dispersion ability
- Narrow grain size spectrum
- Improved optical attractiveness of the product

A typical extrusion pellet line consists of:

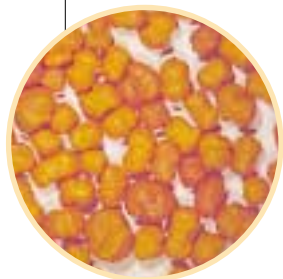
- Powder dispensing
- Wet granulation
- Extrusion
- Pelletizing/Spheronizing
- Drying
- Homogenization



Pellet production plant in vertical arrangement



Extrusion line consisting of a vertical granulator and a basket extruder



Pelletizing Technologies

Asymmetrical wet granulates

The snowball structured granules made in the VG are transferred into the pelletizer while they are still wet to ensure that they are elastic and do not break during the spheronization process. Dust created in the pelletizer is rolled up and integrated into the pellets. The fast spinning of the pelletizer disk forces the granules to the rim of the disk and at the same time into the spinning direction. This results in a rolling movement of the granules in two dimensions - similar to a helix. This intense rolling is smoothing the surface. The residence time in the pelletizer is short - usually several minutes. The gap between the pelletizer disk and the wall is closed by means of an air stream which also supports the spinning movement.

Spheronizing extrudates

When forming pellets from extrudates the extrusion process is optimized, so that the extrudates break into pieces with the same length as their diameter. Also the extrudates need to be wet when entering the pelletizer to make sure that they can be spheronized without further breakdown. The structure of the granules is dependent on the granulation process prior to spheronization. The product quality of the pellets can rather be influenced by changing the recipe and the process parameters during granulation/extrudation process, than during the spheronizing process. By means of multiple pelletizers arranged in a cascade the spheronization can be run continuously. Changing the height of the discharge orifice changes the amount of product in the pelletizer. If the throughput remains constant the residence time is influenced, resulting in a different quality of the pellets.

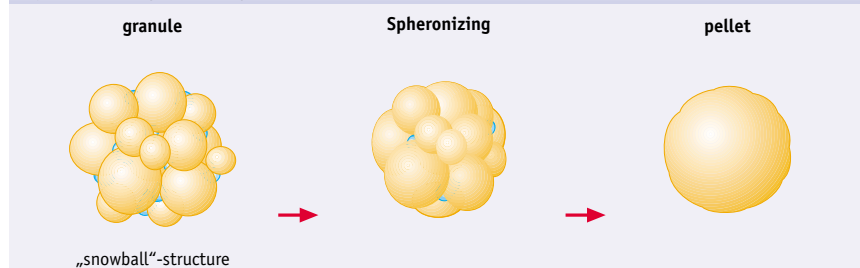
Building pellets from powder (powder layering, powder coating)

Seeds are charged onto the rotor disk and moved by the spinning of the disk and the air flow through the gap at the wall of the process vessel. Powder and binder liquid is sprayed tangentially into this bed of material. The powder is rolled up to the seeds, the rolling movement ensures spherical particles. The air flow at the wall is drying the pellets - allowing for more binder liquid. It also is possible to add several layers of powder onto the seeds within one batch. After building the first layer the pellets are dried and the next layer is added with its specific binder.

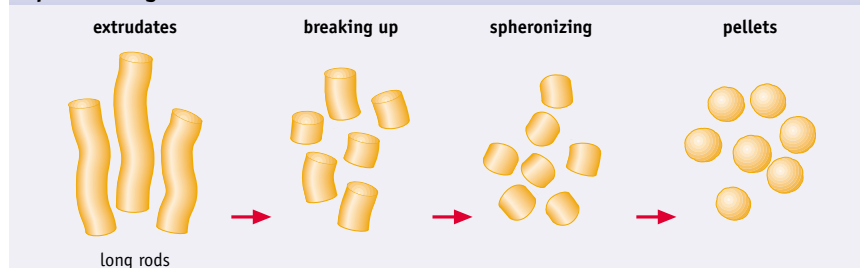
Pilling of seed grains

The Pilling process is similar the powder layering, only starter cores (e.g. seed grains) are used here for coating with functional powder layers.

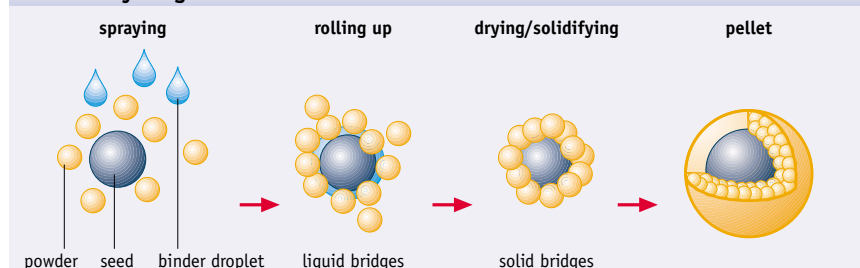
Spheronizing of wet granules



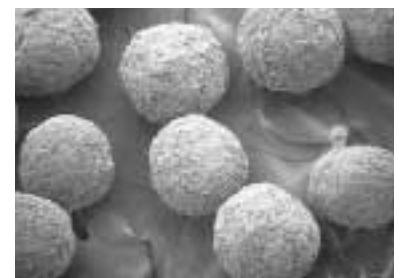
Spheronizing of extrudates



Powder layering



Lab size pelletizer type P 50



Snapshot from a SEM microscope of pellets

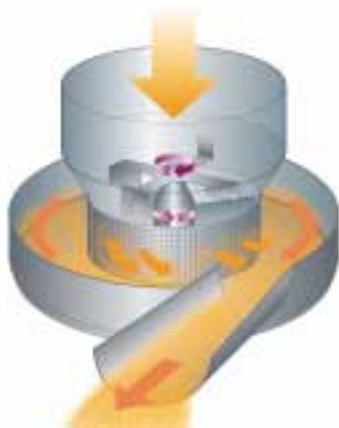


Der Glatt Basket Extruder GBE

Mode of operation

Within the extruder plasticized wet product is falling continuously into the screening chamber. Here and moving in opposite directions are turning, extrusion and pressure blades. While the pressure blades provide for sufficient compression of the product, the extrusion blades press the product onto the exterior of the screen and the extruded material of approximately equal length falls onto the lower rotation plate.

After that the extruded product is moved into the discharge unit via a scraper blade for the next process stage (for example pelletizing). The length of the extruded material depends on the characteristics of the product, the gap width and the rotating speed. Sensors ensure that the default parameters for the product and extrusion process are always maintained.



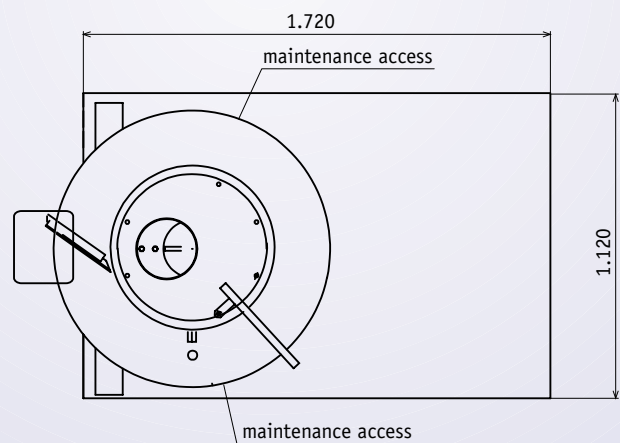
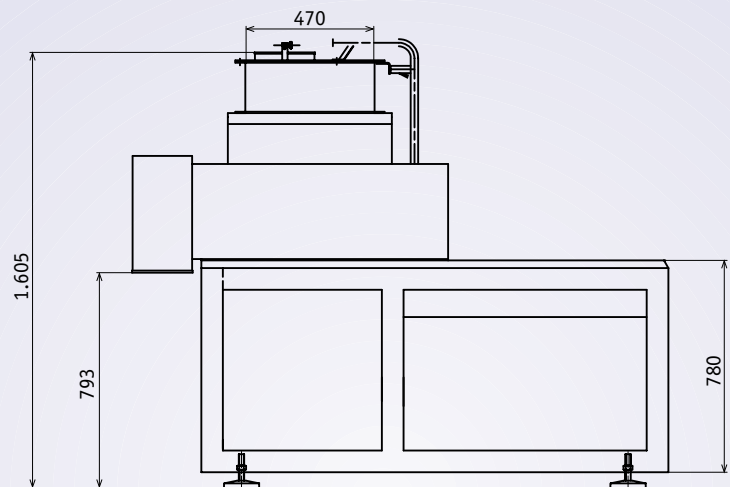
Principle of the extrusion process



Production of stable and uniform extrudates

Product line

Glatt offers with the basket extruder types GBE 450 and GBE 600 two sizes with through-put performances of approx. 300 kg/h up to 1500 kg/h. Screen inserts with holes from 0.8 to 1.5 mm are offered as standard. Other hole sizes are available as options.



Dimensional drawing of a basket extruder type GBE 600

Technical Data

Type (Product line):	GBE 450	GBE 600
Throughput rate:	300 kg/h ... 600 kg/h	700 kg/h ... 1.500 kg/h
Weight:	900 kg	2.000 kg

Particle sizes:	Ø 0.8 mm ... 1.5 mm (others upon request)	
Power line:	400 V / 3 Ph / 50 Hz (others upon request)	
Materials:	product contacting metallic parts made of stainless steel AISI 304 or better. Sealings made of silicone rubber or POM.	
Surface finish:	screens:	polished Ra < 0.5 µm
	Screening chamber:	ground Ra < 0.8 µm
	Turn table/discharge:	ground Ra < 1.2 µm
	Visible covers:	ground Ra < 1.2 µm
	Non-visible covers:	glass bead blasted
Protection class:	Motors and unit controls in non-Ex execution and class IP 54.	
Safety:	All components are earthed. Not suitable for use with toxic or easily inflammable products.	
Controls:	Operation via an integrated control cabinet (which can also be remotely installed).	

Subject to technical modifications. Other types and designs upon request.



Operation panel with a clear indication of unit and process data



Product discharge with thermometer sensor



Glatt basket extruder type GBE 600

The Glatt Pelletizer P

Applications

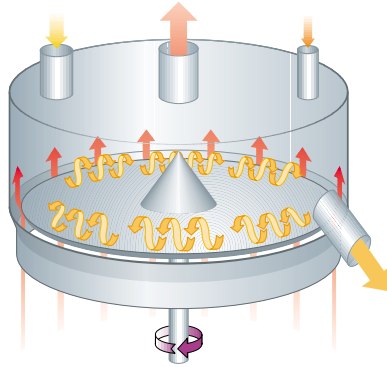
The pelletizer P (also called spheronizer) is the ideal unit for rounds of granulates and extrudates, powder layering of pellet from powders and coating starter cores (pilling).

Whether food, feed, pharmacy, detergent and colour chemistry, life-science, seeds or fertilizer production, the pelletizer P is suitable for all applications.

Mode of operation

Wet granulate or extrudate particles are fed through an eccentrically arranged product entry opening into the working vessel (product vessel). The fast rotation of the pelletizer disk forces the granules to the vessel wall and simultaneously into the direction of rotation. This results in a rolling movement of the granules in two dimensions, similar to a helix. This intense rolling action smooths the granule surface in a short time. A gap of $0.3 + 0.2$ mm between pelletizer disk and vessel wall is closed with a constant pure air flow generated by an internal ventilator, which prevents the penetration of product into the interior of the pelletizer.

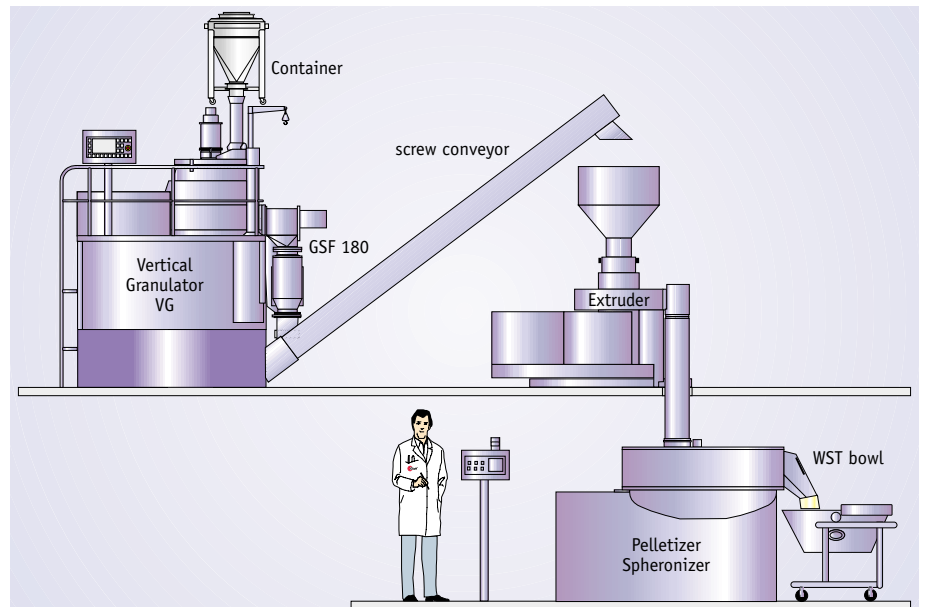
The design execution of the working vessel and in particularly of the discharge unit, are appropriate for continuous and batch operation. The discharge of the finish-rounded product is carried out through the discharge unit connected with a product pipe into the next unit of a pelletizer cascade or into another process unit and/or into a storage vessel (e.g. IBC). The rolling-up period or residence time is depending on product specifics and rotor disk speed. The rolling-up rate can be like-wise adjusted by setting the rotor disk speed or by using a modified rotor disk structure.



Principle of the spheronizing process



Cascade of two pelletizer type P 100



Pellet line over two levels



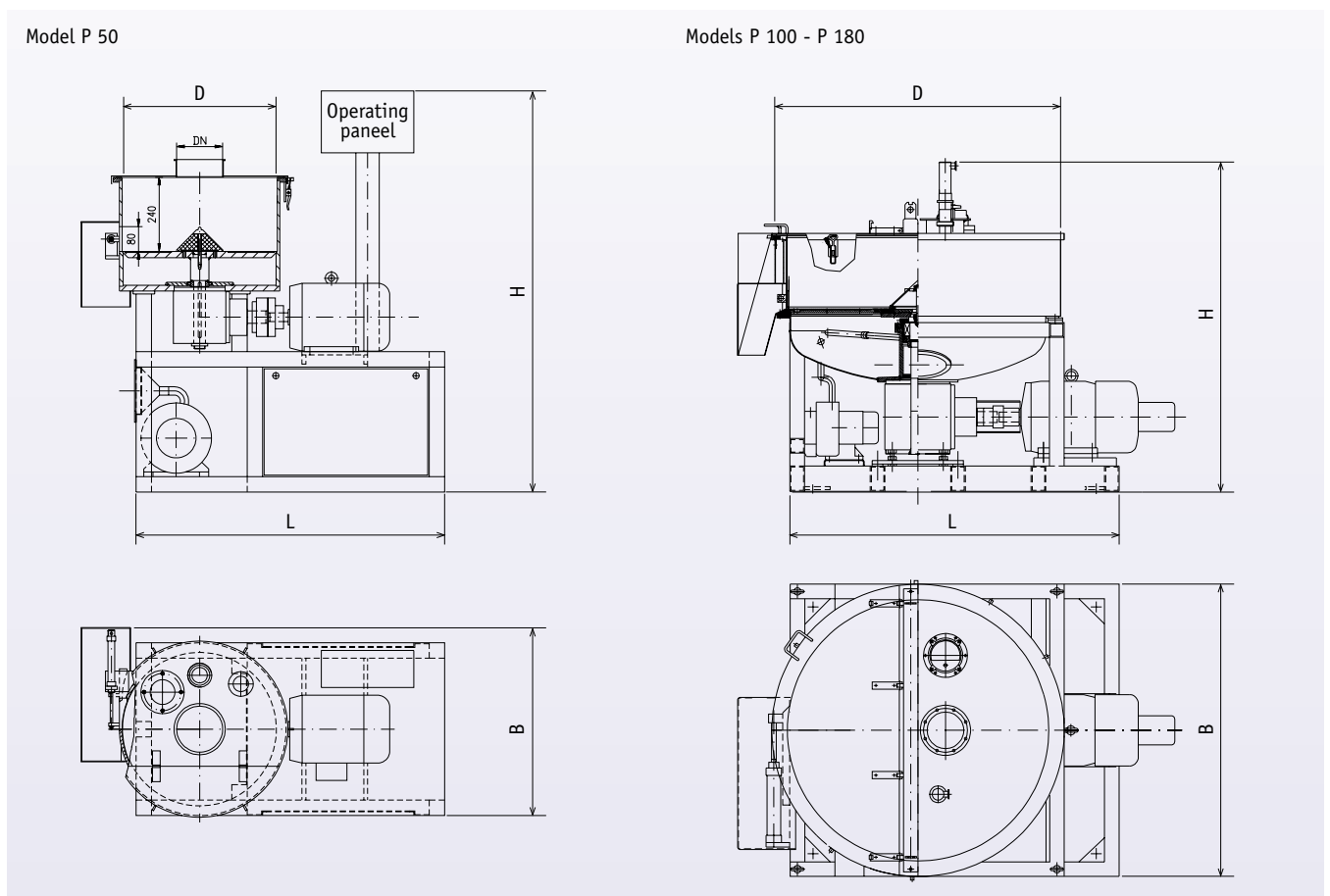
Discharge of a pelletizer type P 140

Technical Data

Type (Product line)		P 50	P 100	P 140	P 180
Disk diameter D	mm	500	1000	1400	1800
Disk speed	l/min.	75 - 800	50 - 400	50 - 250	20 - 160
Required power	kW	4	15	30	45
Power of seal air ventilator	kW	1.1	1.1	1.1	1.1
Max. temperature of seal air	°C	80	80	80	80
Lenght L	mm	1000	1700	2200	3000
Width B	mm	600	1200	1600	2000
Height H	mm	1500	1600	1800	2000
Weight	kg	500	1000	2000	3800

Model P 50

Models P 100 - P 180



- Power line:** 400 V / 3 Ph / 50 Hz (others upon request)
- Materials:** All metallic parts made of stainless steel AISI 304 (other metallic material upon request). Sealings made of silicone rubber or POM (others upon request).
- Surface finish:** product contacting: welding seams ground, Ra < 0.8 µm, brushed and passivated.
exterior: welding seams flush ground Ra < 1.2 µm, brushed and passivated.
- Protection class:** Motors and unit controls in non-Ex execution and class IP 54.
- Controls:** Using autark mode via a clear operation panel type Stahl MT 310, integration of the unit into a super control system is possible. On model pelletizer type P 50 the complete unit control is integrated in the machine frame, whilst from model P 100, an external control cabinet is supplied.

Subject to technical modifications. Other types and designs upon request.

Addresses



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