UNDERWATER-PELLETIZING SYSTEMS
for Processing of Thermoplastics
KREYENBORG GROUP

BEST TECHNOLOGY INSIDE!

The KREYENBORG GROUP is comprised of the following companies: KREYENBORG GmbH, BKG Bruckmann & Kreyenborg Granuliertechnik GmbH, Bruckmann Steuerungstechnik GmbH (BSG) and KREYENBORG PLANT TECHNOLOGY GmbH & Co. KG (KPT).

As family owned and operated companies, the members of the KREYENBORG GROUP have been recognized for more than 50 years as a byword symbolizing quality components and machines for the extrusion and polymerization industries. Customers around the world know and trust the equipment and systems of the KREYENBORG GROUP. This has allowed us to become a global partner for the plastics industry.

We have realized that providing a complete system with each of the various components designed to be compatible as a unit, offers the optimal solution and ensures an efficient utilization of the equipment. All of our systems are manufactured in-house; combining automation technology together with screen changers, melt pumps, pelletizers and bulk material handling equipment. All of the components are from a single source. Therefore, problems with interfacing between the various components are completely eliminated.

The family run KREYENBORG GROUP has over 300 employees world-wide, all of whom share a common corporate philosophy – to support our customers in achieving their goals through continuous improvements and constant self-monitoring. Quick decision-making, a focus on long-term business strategy and the close relationship between the owners and their companies and employees play a crucial role. Customer satisfaction is at the centre of our daily routine.

Our engineering can provide the smooth integration of all components into existing systems while maintaining a minimum of process interfaces and ensuring the synergy of the overall project. Due to significant vertical integration, a high proportion of the components for our machines are manufactured in-house. Components may also be custom designed to suit the requirements of individual customers. The member companies of the KREYENBORG GROUP support our customers individually and flexibly.

As a special service we offer customers the opportunity to perform trials of their materials in our own, modern, test laboratory. Here it is possible for the customer to view their own material being processed under real production conditions using the different equipment items produced by the KREYENBORG GROUP.

We are focused on the production location remaining in Germany. Because of this we are able to offer the advantages of “Made in Germany” to our customers.

For our customers this means:
- Reliable and precise manufacturing
- Complete, in-house, quality control
- A high level of innovation demonstrated by many patents
- Quality certified, “Made in Germany”

Because of our own sales and service branches in China and the USA; together with our industrial representatives world-wide; the KREYENBORG GROUP is able to assure a high level of customer service.

www.kreyenborg.com
filtration systems | pump technology | polymer valves

www.bkg.de
underwater pelletizing | centrifugal dryers

www.bsg.de
automation technology

www.kreyenborg-pt.com
infrared technology | mixers | special silos | extruder feeding systems
BKG was founded in 1994 and has aimed to granulate the new technical polymers like PET, PA6, PBT under water. This ambitious target has been achieved, what is confirmed by hundreds of supplied underwater pelletizing systems worldwide for applications in extrusion and polymerisation with throughputs from 2 to 35,000 kg/h.

In addition to supplying parts for our own underwater pelletizing and drying systems, we also offer die plates, blades and cutter hubs for other manufacturers pelletizers.
In polymer processing, the underwater pelletizing system proves to be the up to date solution.

It is a complex process and has to be observed in its entirety. Therefore, after having intensively checked the respective procedural specifications, BKG offers complete resp. perfectly supplemented systems.

Compared with traditional dryer and strand pelletizing systems, this technology has a number of advantages:

**PRODUCT QUALITY**
- High product cleanness and homogeneity
- No oxidation of the product
- Optimized and constant dispersion in the follow-up processes

**OPERATION, MAINTENANCE, PROCESS STABILITY**
- Safe granulation without down time
- No strand tear – low risk of default
- Low rate of waste due to the automated starting process
- No “threading” of the strand
- Very low maintenance costs
- Automatic cutter adjustment and blade sharpening feature

**REQUIRED SPACE, EMISSION**
- Very compact design, little space is required
- Efficient use of cooling and process water
- Low steam and noise emission
- Very clean operation

**FLEXIBLE APPLICATION**

BKG underwater pelletizing systems cannot only be used for thermoplastic polymers but are also suitable for all materials which behave like thermoplastic polymers:

- **Polyolefines**
  - e. g. LLDPE, LDPE, HDPE, PP, EPDM
- **Polyvinyl chloride**
  - e. g. PVC-P (soft-PVC)
- **Styrol polymers**
  - e. g. PS, SAN, ABS
- **Acrylic resin**
  - e. g. PMMA
- **Polyacetal**
  - e. g. POM
- **Polycarbonate**
  - e. g. PC, PET, PBT, PEN
- **Polyamide**
  - e. g. PA 6, PA 6.6, PA 11, PA 12
- **Polymerblends**
- **Thermoplastic elastomers**
  - e. g. TPE-S, TPE-O, TPE-E, TPE-A
- **Polyurethane**
- **hot-melt adhesive**
  - e. g. auf Basis von EVA, APAO, PA
- **Natural resin**
  - e. g. chewing gum basic material
- **Synthetic resin**
  - e. g. Epoxide resin
QUALITY AND RELIABILITY

Customer satisfaction by quality in all aspects becomes more and more the decisive factor of success. The BKG business strategy is consequently focused on two targets: First of all, to offer the customer first-class products and service at competitive prices. Secondly, to provide the employees with conditions to work in a committed, successful and satisfying way.

Therefore, the internalised quality management according to DIN EN ISO 9001 is an essential component of the corporate concept.

In all areas of polymer processing, we support the customer as practically orientated problem solver on a basis of cooperation.

But our principle is quite simple: Concrete solutions for the practice – simple handling, precise and with high availability in use showing economical performance at the same time.

IN-HOUSE LAB LINE

With a wide range of applications of underwater pelletizing systems, individual parameters have to be adjusted exactly to product and procedure in order to achieve optimal results.

In order to determine these important parameters, BKG operates an own lab line for trials with customers’ material. A complete extrusion line with different systems for pelletizing and drying is available. Among melt pump and filters, also a number of extruder feeding and dosing systems is available.

All process data are recorded and analysed so that the line, which has to be delivered, exactly meets customers’ requirements. A lot of experience is contributed when the procedure of the customer is optimized in the lab line and a reproducibility is realized.

We are well prepared to place our know how in the lab line at your disposal and provide the ideal solution for your process.
EQUIPMENT COMPONENTS
POLYMER DIVERTER VALVE – BYPASS PIPING – PELLETIZER – TEMPERED WATER SYSTEM

POLYMER DIVERTER VALVE

The polymer diverter valve consists of a heated housing and hydraulically movable piston. By hydraulic actuation of the piston the melt flow can be diverted e. g. towards the floor or directed towards the die plate.

The diversion is necessary because the desired optimal melt flow per die plate hole can not be generated instantaneously, by the preceding equipment (e. g. extruder), at start-up.

The polymer diverter valve also separates the pelletizing process from the preceding process (i.e. extruder) so that both of them can be shut down separately in case of minor faults or changes made at the pelletizing side.

BYPASS PIPING

The bypass means the piping around the cutting chamber. The process water entry into the cutting chamber can be exactly timed by this bypass piping and the two 2/2 way valves, the 3/2 way valve (all valves incl. final position indicator) and the related SPS programming.

This avoids a freeze-off (blocking) of the die plate holes if the process water enters too early and, furthermore, agglomeration of the pellets if the process water enters the cutting chamber too late. Also a high loss of process water is avoided when the pelletizer is uncoupled.

All electrical equipment is pre-wired on a bigger terminal box where the plugs for the polymer diverter valve, the die plate heating and the pelletizer are connected for easy and quick electrical and mechanical disassembling of these units, e. g. if extraction of the extruder screws is necessary.
PELLETIZERS FOR 2–35.000 KG/H

The pelletizer cuts the polymer strands into pellets in the cutting chamber, which is completely filled with water, immediately after they have passed the die plate. Because of the high temperature difference between melt and water, the cut polymer drops solidify immediately into the characteristic spherical form of underwater-cut pellets (spherical form depends on the product viscosity).

The different types of BKG pelletizers work with a throughput of 2–35,000 kg/h. The designation of the pelletizer models refers to the method used to obtain cutter pressure. With type A pelletizers the pressure is regulated using a hand-wheel with micro metric adjustment. With pelletizers of the types AH and Compact the cutter pressure is automatically controlled by means of a hydraulic system.

CUTTING CHAMBER WITH DIE PLATE

The die plate is designed according to customer requirements and the specified material. Heating is provided electrically or by means of fluid transfer, oil heating. Oil-heated die plates are frequently used for higher material throughputs or for micro-pellet production.

The hydraulic system fully automates the forward feed of the cutter shaft (higher force during startup and step-by-step reduction down to minimum force during regular production). This assures a constant production because the optimum application pressure is reproducible.

Also the blades at the die plate can be re-ground to predefined values to level the blade wear occurring during production and to guarantee that the cutter maintains optimal contact with the cutting surface of the die plate.

The pelletizers are equipped with a flexible shaft head upon which the cutter assembly is mounted. The arrangements compensate for any misalignment between the cutter assembly and the die plate cutting surface.

Oil-heated die plate

Pelletizer AH D300 for throughputs of up to 20,000 kg/h
CENTRIFUGAL PELLET DRYER
INCL. EXHAUST BLOWER

The centrifugal pellet dryer separates process water and pellets which move helically because of the fast rotation of the dryer and the angled rotor blades, upwards to the top of the dryer and are leaving the dryer continuously through the pellet outlet. Because of the rebound effect and the counter current airflow generated by the exhaust blower the pellet outlet moisture is designed for less than 0.05% depending on the type of polymer and reduces hygroscopicity to a minimum.

AGGLOMERATE CATCHER (OPTIONAL)

At the first production step upstream of the pellet dryer, this agglomerate catcher prevents pellet clusters (agglomerates) entering the rotor area of the dryer.

Inside of the agglomerate catcher housing the pellet/water mixture passes inclined angled bars which are filtering bigger agglomerates. These are leaving the system via a flapper gate actuated by a photo-electric eye.

PELLET DIVERTER VALVE (OPTIONAL)

This pneumatic operated pellet diverter valve is mounted at the dryer outlet and allows for example the elimination of low quality pellets during start-up or sampling of pellets during production.
TEMPERED WATER SYSTEMS
IN MODULAR DESIGN

To meet customers’ requirements, BKG is now delivering their systems in modular format. Each element can be installed individually. Thus changes in the equipment line-up to suit product requirements may be accomplished as quickly and easily as possible.

The basic version of the new system contains the dryer and water tank with accessories for simple processes in the field of non-filled polyolefin’s.

PROCESS WATER UNIT

After the separation of process water and pellets the water is filtered in the water tank by passing a screen package. A water heating device is mounted at the water tank to heat up the process water before production starts as well as the piping for over-flow and refilling incl. valve. The water level inside the water tank is controlled by a measuring transducer and can be set independently to minimize the amount of refilled water or to avoid higher water losses.

The process water is primed by the water pump through the tubular or plate-in-frame heat exchanger to ensure the possibly necessary cooling. The regulation of the cooling water refill is done by a steadily working valve.
BKG MASTER- AND COMPACT-SYSTEMS

These systems include a large power spectrum of 2 to 2,000 kg/h. Because of the integration of the know-how of the big machines of the BKG both the Master-System and the Compact-System convince by simple handling and compact design. The pressure acting of the cutter head can be adapted individually and product optimally by handwheel fine adjustment (Master-System) or hydraulically (Compact-System). The systems can be put up in the smallest room and are easily transportable at any time.

Further advantages in particular for compound and master batch production:

- flexibility with respect to the granulated material
- flexibility with respect to new materials and colours
- flexibility with respect to the production of various pellet sizes, thanks to fast
- easy and fast cleaning of the system components
- production of micro granulates

A new design of perforated plates permits processing of not only all the customary plastics such as PE, PP, AB etc. but also products as PA 6, PA 6.6, PBT, PET and PPO.

A further important step towards the processing of critical high-temperature products.
PELLETIZER A 300 AND A 2000

The micro-metric adjustment of the pelletizer guarantees precise control of the blades against the die plate.

This ensures long blade and die plate life. The quick exchange die plate can be exchanged within only 10 minutes. Various hole diameters can be used.

EASY CLEAN WATER TANK

The master water tank (heating optional) provides the water flow of the pelletizing system, which cools down the pellets directly after leaving the perforated plates. Any fines are collected on a large woven wire mesh screen in the tank.

The mesh screen and the tank can be cleaned within a very short time to avoid cross contamination between colour batches.

AGGLOMERATE EJECTION (OPTIONAL)

Any agglomerates are automatically detected as they break the light beam of a “photo-eye”. When clumps of pellets are detected the agglomerate gate automatically opens and any oversized material is ejected before it enters the dryer.

EASY CLEAN CENTRIFUGAL DRYER

After being cut the pellets are separated from the transport water in the centrifugal dryer and dried in the counter-air flow.

Thorough cleaning is made easy by two large doors and a removable one piece rotor screen – essential when producing colour compounds and master batch.

CONTROL PANEL

The master system is delivered with a compact control panel. The operator friendly panel shows all process data as well as graphs. The onscreen help function assures easy handling.
COMBI-LINE
MODULAR WATER- AND DRYING-SYSTEM FOR THROUGHPUTS OF UP TO 2,000 KG/H

The Combi-Line type is used for applications with medium throughputs, especially for compounding lines. Good access to the centrifugal dryer is afforded by the two large doors. This allows the one-piece screen to be changed easily.

The basic version of the Combi-Line is equipped with a sieve for very fine particles integrated in the tank, which can be cleaned or exchanged during production.

As an option the customer can choose a curved screen directly or install it later on to have a further continuous filtration step.
CURVED SCREEN
(OPTIONAL)

As some plastic pellets tend to have a higher abrasion, and therefore also a higher development of finest particles, and the filter element in the water tank might not be sufficient, the curved screen serves as an additional continuous filtration device of the process water.

The process water coming out of the centrifugal dryer is taken in by a pump and pumped into the housing of the curved screen. Because of the special construction of the housing the water flow is calmed down and the process water is guided by overflow principle continuously over the curved screen. The filtered process water then flows into the water tank. The standard curved screen has got a pneumatic cover with window. The filtered particles are collected in a filter case and can be taken out easily.

OPTI-LINE
FOR THROUGHPUTS UP TO 20.000 KG/H

The Opti-Line type is a modular system like the Combi-Line. This type is used for all applications of extrusion and polymerisation lines. With Opti-Line the customers have a system, which offers the optimum of equipment, as the name already implies.

- noise reduction of the dryer ≤ 80 dBA
- filter system for the air inlet of the centrifuge
- pre-dewatering to be integrated into the dryer (installation possible at any time)
- centrifugal dryer can be designed with window and lights
- self-cleaning system for centrifuge and screen can be integrated

Even at high water temperatures no steam escapes in the environment.
The process water exits from the dryer and enters the filter unit which is comprised of several screen elements. The water level in the filter unit is monitored. If the level rises, the filter unit is rotated by means of a gear motor so that clean screen elements are always in the filtering area. The dirty screens are cleaned by means of water jet cleaning nozzles. The contaminant is deposited into a filter cassette drawer which must be cleaned periodically. As an optional extra, a continuously operating belt filter is available in place of the filter cassette drawer.
LABORATORY SYSTEM

LAB-LINE

LAB-LINE100 – UNDERWATER PELLETIZING
FOR LAB OPERATION FROM 2 TO 200 KG/H

Our LabLine 100 pelletizer system is the ideal machine for small scale extrusion and polymer processing lines. The LabLine 100, which features simple controls and a compact design, is made up of a pelletizer, a pellet dryer and a process water treatment system.

Commencing from a throughput of 2 kg/hour, all common plastics such as PE, PP, ABS and in particular products like PA6, PA6.6, PBT, PET and PPO can be processed and pelletized.

The system can be supplied with either of two different pelletizers; the type A 30 or the type A 300.

The type A 30 pelletizer has a die plate diameter of 30 mm and is suitable for a material throughput of from 2 - 80 kg/hour. The type A 300 has a die plate diameter of 75 mm and is suitable for a material throughput of up to 200 kg/hour. The quick-change die plate is designed to suit the particular material being processed. A range of different hole diameters is available.

ADJUSTING BLADE PRESSURE

The micrometric hand adjustment guarantees a precise adjustment of the blades in relation to the die plate. This assures a long life span for both the blades and die plate.

As an optional extra, the pelletizer A 300 can be equipped with a fully automatic hydraulic feed system to adjust the blade pressure.
The rotor unit of the LabLine 100’s pellet dryer may be quickly removed by operating the mechanical lifting device supplied. This enables a rapid clean-up of the dryer. The one-piece cylindrical screen cover which surrounds the rotor may be removed for cleaning. The integrated process water filtration is also designed for easy removal.

As standard the LabLine 100 is delivered with process water heating, a tubular heat exchanger and a control cabinet which is integral with the water and drying system. The temperature controlled LabLine 100 pelletizing system has its own water tank to provide process water flow to the die plate. The process water acts as a transport medium for the pellets and also ensures cooling of the pellets as soon as they have been cut.

**PROCESS WATER FILTRATION**

Any fines are collected on a large woven wire mesh screen. This mesh screen can be completely removed and replaced to ensure no cross contamination colour batches. Pellets are cut at the die plate, within the water box, and are transported to the centrifugal dryer where most of the water is removed. The water is then filtered and returned to the water box. Meanwhile pellets are transported to the dryer outlet and exit with low residual moisture for immediate packing.

The process water piping for the water box is included in the scope of supply.
BKG CENTRIFUGAL DRYERS

BKG also offer stand alone centrifugal dryers for drying a wide range of pellets.

Installation with capacities of 50 kg/h to 17,000 kg/h can be supplied – based on customer requirements.

Advantages:
- good accessibility to all components
- fast colour and product change
- optional sound insulation – 80 dBA
- stainless steel blower
- integral filter for centrifuge air exhaust
- optional integral pre-drainage of the dryer
- optional vision panel and interior lighting
- integral cleaning system for the centrifuge with high pressure, rotating and fixed rotor shaft, jets.

BKG centrifugal dryers can be equipped with agglomerate catchers at the dryer inlet and a pellet guide at the dryer outlet.

A wear protected version is available for abrasive plastics (such as glass fiber filled polymers). As BKG dryers are modular, simple upgrade of the wear protection is possible.
# CENTRIFUGAL DRYERS

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<thead>
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<tbody>
<tr>
<td>Throughput kg/h</td>
<td>up to 200 kg/h</td>
<td>up to 1,200 kg/h</td>
<td>up to 2,000 kg/h</td>
<td>up to 2,700 kg/h</td>
<td>up to 7,000 kg/h</td>
<td>up to 17,000 kg/h</td>
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<td>Water quantity m³/h</td>
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<td>30</td>
<td>40</td>
<td>40</td>
<td>60</td>
<td>–</td>
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<td>Air mass m³/h</td>
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<td>1,800</td>
<td>3,200</td>
<td>4,500</td>
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<td>Motor kW</td>
<td>4 kW</td>
<td>4 kW</td>
<td>4 kW</td>
<td>5,5 kW</td>
<td>7,5 kW</td>
<td>7,5 kW</td>
<td>18,5 kW</td>
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<tr>
<td>Sound reduction</td>
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<td>yes</td>
</tr>
<tr>
<td>Dryer self-cleaning</td>
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<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>Water quantity with initial drainage</td>
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<td>not possible</td>
<td>not possible</td>
<td>up to 80 m³/h</td>
<td>up to 100 m³/h</td>
<td>up to 160 m³/h</td>
<td>up to 200 m³/h</td>
</tr>
</tbody>
</table>

- **Initial drainage which can be cleaned easily**
- **Easily accessible interior with self-cleaning system**
CrystallCut® was developed to produce free flowing crystallized PET granulate, gently and economically. In the conventional crystallization process, PET granulate has had a tendency to crystallize with a lack of homogeneity – the amorphous part is too high, and the degree of crystallization very low.

Since amorphous PET has the tendency to stick together, it has been a severe problem. To crystallize the material sufficiently, it was necessary to supply the crystallization process with sufficient energy or heat. Till now PET recycling has been more difficult and expensive – the introduction of CrystallCut® offers economic PET recycling.
We start at the point where the PET melt has been extruded by the die and cut by the face cutter. The cut hot PET granulate is now rapidly transported in hot water (of up to 95°C) to a pellet dryer in the closed conveying pipes, where pellet cooling and solidifying takes place.

Important criteria in the effectiveness of CrystallCut® are the conveying medium and relatively short conveying distances between the die head and the pellet dryer. PET pellets exit the pellet dryer at a temperature of about 150–160°C onto a vibrating conveyor which is designed in a similar way to oscillating separators of undersize and oversize pellets (but there are no sizing screens). The conveyor is divided into several zones, the vibrators keeping the pellets in permanent motion which enables them to pass on their energy to other pellets. In each zone, circulation of PET pellets stops them sticking together. At the completion of the process the PET pellets will have attained a degree of crystallinity of up to 40%. They have a temperature of approximately 180 °C and may be transferred directly into a SSP.

**ADVANTAGES OF CRYSTALLCUT®**

- degree of crystallization approx. 40%
- almost dust-free product
- up to 8% higher bulk density
- lower energy consumption
- reduced production costs
- direct transportation into the SSP possible
- quick start-up of the line and change of product
- due to the even crystallinity, the PET cannot stick together

For example, with a line producing 1000 kg/h it is possible to save up to 123,000 €/year in energy costs (Based on 0,125 €/kWh).
The BKG Bruckmann & Kreyenborg Granuliertechnik GmbH has broad experience in the area of wear resistance. Due to continuous improvement of the various components it has been possible, over the last five years, to reduce the cost of wear & tear on the machinery by 50%.

When producing glass-filled plastic compounds, it is inevitable that wear to the machine components will occur. However, the BKG pelletizing systems which have been specially developed for this application offer significant advantages. In particular when dealing with high material throughput levels of up to 6 t/hour, the fully automatic pelletizer offers a good return on investment. The familiar strand breaks which occur frequently with conventional strand pelletizing equipment, become a thing of the past. Consequently, the personnel requirement is reduced to a minimum while the amount of scrap is greatly reduced. Together with the quick start-up feature of the underwater pelletizer this results in very efficient production. Further advantages of the BKG system are the compact design and the closed loop system which prevents dust or steam from entering the production area. The underwater cutting of the polymer melt has

Finally the cutting of the polymer in the molten state by the underwater pelletizing process, has a proven track record in the production of PP, PBT, PC and PA compounds with up to 66% glass fiber.

The cutting chamber, water inlet and outlet are fitted with exchangeable wear resistant liners (highlighted in yellow) that may be quickly replaced whenever necessary. The seal cover on the pelletizer casing and the cutter hub are made of a special, wear resistant material.

The rotor lifters, inlet assembly and outlet assembly are manufactured from wear resistant material. These components (highlighted in yellow) are exchangeable and may be replaced as necessary. The dryer screen has a wear-resistant coating.
When necessary, the blades should be rotated to use the other cutting edge. This ensures the maximum usage of the blades. By means of a small modification it is possible to install a device that gives a visual indication of the remaining length of the blade. This indicator is of simple design, easy to install and has no wearing parts. The indicator provides a valuable process control and helps to avoid unexpected interruptions to production.

**DIE PLATES**

The die plate, the core of the underwater pelletizing system, essentially influences the process and quality of the pellets. Moreover, by changing the die plate, the system can simply be retooled for another product or also micro pellets can be produced. Regarding the die plate design, BKG leaves nothing to chance but relies on latest technology which is scientifically state-of-the-art. Pressure build-up, flow dynamics simulation and temperature distribution significantly define the geometry of the die borings. A decisive step for optimally designed pelletizing systems.

**ONLINE GRINDING DEVICE**

In order to always have optimal production conditions, the die plate has to be regrinded depending on wear.

With the BKG online grinding device, time can considerably be saved. Instead of the cutter hub, this tool is simply screwed on the pelletizer. After having coupled to the waterbox, the regrinding program which takes only a few minutes can be started. Thus, the complete dismounting and mounting of the die plate is no longer necessary.
**ACCESSORIES**

**CRYSTALLISATION UNIT**

The pellets of some polymer types are very sticky and tend to agglomerate when too warm, or they need certain reaction times for crystallisation. Heat transmission from the pellets to the much cooler process water is relatively slow whereas transport of pellets in the process water pipe can be very fast (a few seconds depending on the pipe length). The dwell time of the pellets in the process water can be increased significantly, up to several minutes, by using this crystallisation unit. As a result, very cold and/or crystallised pellets enter the dryer. The dwell time of the pellets in the water depends on the size of water pump and the length and diameter of the pipe of the crystallisation unit.

**PRESSURE DE-WATERING DEVICE**

In some cases the length of the crystallisation unit pipe is not enough for cooling and/or crystallisation of the pellets, and the dwell time needs to be extended. By using this pressure de-watering device the volume flow of the water-pellet mix inside the crystallisation unit can be decreased without influence on the necessary water flow at the cutting chamber. As a result, the dwell time can be increased dramatically without x-times extension of the tube length.

**DIE PLATE EXCHANGING STATION**

A special exchanging station allows a quicker exchange of the die plates. This frame can hold two complete die plates with waterbox, one of them can be electrically pre-heated to operating temperature.

If the die plate, which is in the pelletizing system, has to be exchanged, it is simply coupled to the free support of the exchanging station. Because of the comfortable lift truck which is integrated into the system, the coupling procedure can easily be made by one operator. Then, the station is moved a little bit backwards, the support frame is turned and the pre-heated die plate can also easily be fixed in the line. Thus, the complete exchanging procedure of the die plates can be made within only a few minutes. Moreover, the long time needed to pre-heat within the line is no longer necessary, therefore, production can directly be started again.

With increasing die plate dimension, the time saving and improved profitability also increase.

Die Plate Exchanging Station in lift position
## TECHNICAL DATA

### TYPE SIZES OF PELLETIZERS PER THROUGHPUT*

<table>
<thead>
<tr>
<th>Pelletizer type</th>
<th>max. 80 kg/h</th>
<th>max. 500 kg/h</th>
<th>max. 2.500 kg/h</th>
<th>max. 7.500 kg/h</th>
<th>max. 15.000 kg/h</th>
<th>max. 20.000 kg/h</th>
<th>max. 35.000 kg/h</th>
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<tbody>
<tr>
<td>A 30</td>
<td>A 300 Compact 75</td>
<td>A 2000 Compact 120</td>
<td>AH 2000</td>
<td>AH 4000</td>
<td>AH D250</td>
<td>AH D300</td>
<td>AH D500</td>
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<tr>
<td>Motor</td>
<td>1 kW</td>
<td>4.4 kW</td>
<td>6.2 kW</td>
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<td>45 kW</td>
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<td>500–3.600</td>
<td>500–2.500</td>
<td>500–2.000</td>
<td>300–1.500</td>
<td>300–1.000</td>
</tr>
<tr>
<td>Die plate heating</td>
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<td></td>
<td></td>
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</table>

*throughput depending on product and die plate

### TYPE SIZES OF WATER SYSTEMS IN MODULAR DESIGN

<table>
<thead>
<tr>
<th>System</th>
<th>Master 300</th>
<th>Master 1000</th>
<th>Master 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput kg/h</td>
<td>2–500</td>
<td>300–1.200</td>
<td>1.200–2.000</td>
</tr>
<tr>
<td>Dryer types</td>
<td>TVE1001ED</td>
<td>TVE1001ED</td>
<td>TVE2000ED</td>
</tr>
<tr>
<td>optional</td>
<td>TVE2000ED</td>
<td>TVE2000ED</td>
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</tr>
<tr>
<td>Dryer motor</td>
<td>4 kW</td>
<td>4 kW</td>
<td>4 kW</td>
</tr>
<tr>
<td>Dryer self-cleaning</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Water tank volume</td>
<td>200 l</td>
<td>350 l</td>
<td>350 l</td>
</tr>
<tr>
<td>Heating capacity</td>
<td>9 kW</td>
<td>2 x 9 kW</td>
<td>2 x 9 kW</td>
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<tr>
<td>Volume flow m³/h max.</td>
<td>15</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Curved screens</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Curved screen motor</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Cleaning system</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>Combi-Line 1</th>
<th>Combi-Line 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput kg/h</td>
<td>500–1.200</td>
<td>1.200–2.000</td>
</tr>
<tr>
<td>Dryer types</td>
<td>TVE1001ED</td>
<td>TVE2000ED</td>
</tr>
<tr>
<td>optional</td>
<td>TVE2000ED</td>
<td></td>
</tr>
<tr>
<td>Dryer motor</td>
<td>4 kW</td>
<td>4 kW</td>
</tr>
<tr>
<td>Dryer self-cleaning</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Water tank volume</td>
<td>500 l</td>
<td>700 l</td>
</tr>
<tr>
<td>Heating capacity</td>
<td>24 kW</td>
<td>40 kW</td>
</tr>
<tr>
<td>Volume flow m³/h max.</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Curved screens</td>
<td>BS 700</td>
<td>BS 700</td>
</tr>
<tr>
<td>Curved screen motor</td>
<td>4 kW</td>
<td>4 kW</td>
</tr>
<tr>
<td>Cleaning system</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>System</td>
<td>Opti-Line 1</td>
<td>Opti-Line 2</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Throughput kg/h</td>
<td>500–1.200</td>
<td>1.200–2.500</td>
</tr>
<tr>
<td>Dryer types</td>
<td>TVE2004SR</td>
<td>TVE2004SR</td>
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<td>optional</td>
<td>TVE6002SR</td>
<td>TVE6002SR</td>
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<tr>
<td>Dryer motor</td>
<td>5,5 kW</td>
<td>5,5 kW</td>
</tr>
<tr>
<td>Dryer self-cleaning</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Water tank volume</td>
<td>500 l</td>
<td>700 l</td>
</tr>
<tr>
<td>Heating capacity</td>
<td>24 kW</td>
<td>40 kW</td>
</tr>
<tr>
<td>Volume flow m³/h max.</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Curved screens</td>
<td>BS 700</td>
<td>BS 700</td>
</tr>
<tr>
<td>Curved screen motor</td>
<td>4 kW</td>
<td>4 kW</td>
</tr>
<tr>
<td>Cleaning system</td>
<td>Option</td>
<td>Option</td>
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<table>
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<tr>
<th>System</th>
<th>Opti-Line 4</th>
<th>Opti-Line 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput kg/h</td>
<td>5.000–7.500</td>
<td>7.500–15.000</td>
</tr>
<tr>
<td>Dryer types</td>
<td>TVE6002SR</td>
<td>TVE12000SR</td>
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<tr>
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<tr>
<td>Dryer motor</td>
<td>7,5 kW</td>
<td>11 kW</td>
</tr>
<tr>
<td>Dryer self-cleaning</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Water tank volume</td>
<td>1.000 l</td>
<td>2.000 l</td>
</tr>
<tr>
<td>Heating capacity</td>
<td>80 kW</td>
<td>160 kW</td>
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<td>Volume flow m³/h max.</td>
<td>80</td>
<td>120</td>
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<tr>
<td>Curved screens</td>
<td>BS 1000</td>
<td>BS 1200</td>
</tr>
<tr>
<td>Curved screen motor</td>
<td>5,5 kW</td>
<td>11 kW</td>
</tr>
<tr>
<td>Cleaning system</td>
<td>Option</td>
<td>Option</td>
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*higher throughputs on request*
Schematic representation of underwater pelletizing
### QUOTATION FORM
UNDERWATER PELLETIZING SYSTEMS

### CONTACT
<table>
<thead>
<tr>
<th>Customer</th>
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<tbody>
<tr>
<td>Contact person</td>
<td>Dept.</td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Phone</td>
<td>Fax</td>
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</tbody>
</table>

### QUOTATION SPECIFICATIONS

<table>
<thead>
<tr>
<th>Product Output in kg/h</th>
<th>Viscosity Residual moisture %</th>
<th>Weight of pellets /100 pellets Pelett-Ø mm</th>
<th>Extrusion line</th>
<th>Reactor line</th>
<th>Power supply Supply voltage Volt</th>
<th>Supply frequency HZ</th>
<th>Control voltage Volt</th>
<th>Kind of protection</th>
<th>IP</th>
<th>Explosion protection</th>
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</thead>
</table>

### OTHER COMPONENTS

<table>
<thead>
<tr>
<th>Screen changer</th>
<th>yes</th>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt pump</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Adapter</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Control/switch cabinet</td>
<td>yes</td>
<td>no</td>
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</table>

<table>
<thead>
<tr>
<th>Language of quotation</th>
<th>German</th>
<th>English</th>
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</table>

### SPECIAL FEATURES / REQUIREMENTS

WE WOULD LIKE TO RECEIVE FURTHER INFORMATIONS ABOUT

- [ ] Die plates and cutters
- [ ] Melt pumps
- [ ] Melt filters
- [ ] Valve technology
- [ ] Special silos
- [ ] Mixing technology
- [ ] Recycling lines
- [ ] Infrared technology
- [ ] Underwater pelletizing systems
- [ ] Control systems