

dressler  
group

fascination plastic

pharmaceutical  
cold grinding  
warm grinding  
cryo-spraying  
jet milling  
technical  
compounding  
sieving  
mixing  
micronising

## preface

### sometimes it is the little things that count

This is exactly why we present the whole picture in the following pages. Based on comprehensive information presented to you, it will help you make your own decision on how we can help you be even more successful. The following pages will give you a discreet – and hopefully – compelling look into the performance of the Dressler Group. The purpose is to present you with information about a creative, efficient partner for your application and development issues. We have been privileged to take on this role for our other customers for almost 40 years, always with great enthusiasm and commitment.

You decide which area you would like to explore to gain your first impression of the Dressler Group: On page 24 you will find more about our areas of expertise: precise toll grinding of plastics into the finest of powders. Alternatively, get more familiar with our three speciality companies (pages 65 to 73). We are united in the continuous search for successful and distinguishing processes to assist you towards your success: be it in innovation, quality assurance or increased efficiency.

But our most prominent characteristic is that we have been the outside development centre for our customers. We therefore invest regularly in sustainable processes and systems and will remain up to date in particular with certifications, continued education and in-house research (page 52).



We would love to make this knowledge and capacity available to you as well. Our statement that we at the Dressler Group are proud of our systems and application know-how is based on the following reason. It puts us into a position to offer our customers not just optimal consultations, but also our support in all aspects of production for a truly comprehensive partnership: starting with trial grinding batches, as in the case of new product development, all the way through to series production, product maturity and just-in-time delivery.

Renowned manufacturers and users of plastics in the key industries of chemistry, health, aerospace, transport, cosmetics, clothing and 3D printing are already trusted partners. We would be pleased to assist you with our specific roles, such as improving a product's characteristics, preservation, surface properties, flow and gliding quality or the efficient dosing of its raw components. Where can we support you in your processes?

We are pleased to present this brochure to give you some insight into our performance portfolio. Alternatively, you may choose to schedule a personal on-site consultation. In any case, your interest is greatly appreciated!

With best regards from Meckenheim,  
Axel & Jan Dressler



# contents

dressler group:  
the grinding authority

demanding customers	p. 21
a strong alliance	p. 24
tailor-made services	p. 33
highest quality standards	p. 37
innovation lab & technical centre	p. 47
sustainability	p. 52

insights

godding + dressler gmbh	p. 65
linus gmbh	p. 69
micro powder system gmbh	p. 73

appendix

glossary	p. 83
imprint, contact	p. 94





28

plants

x

8

processes

x

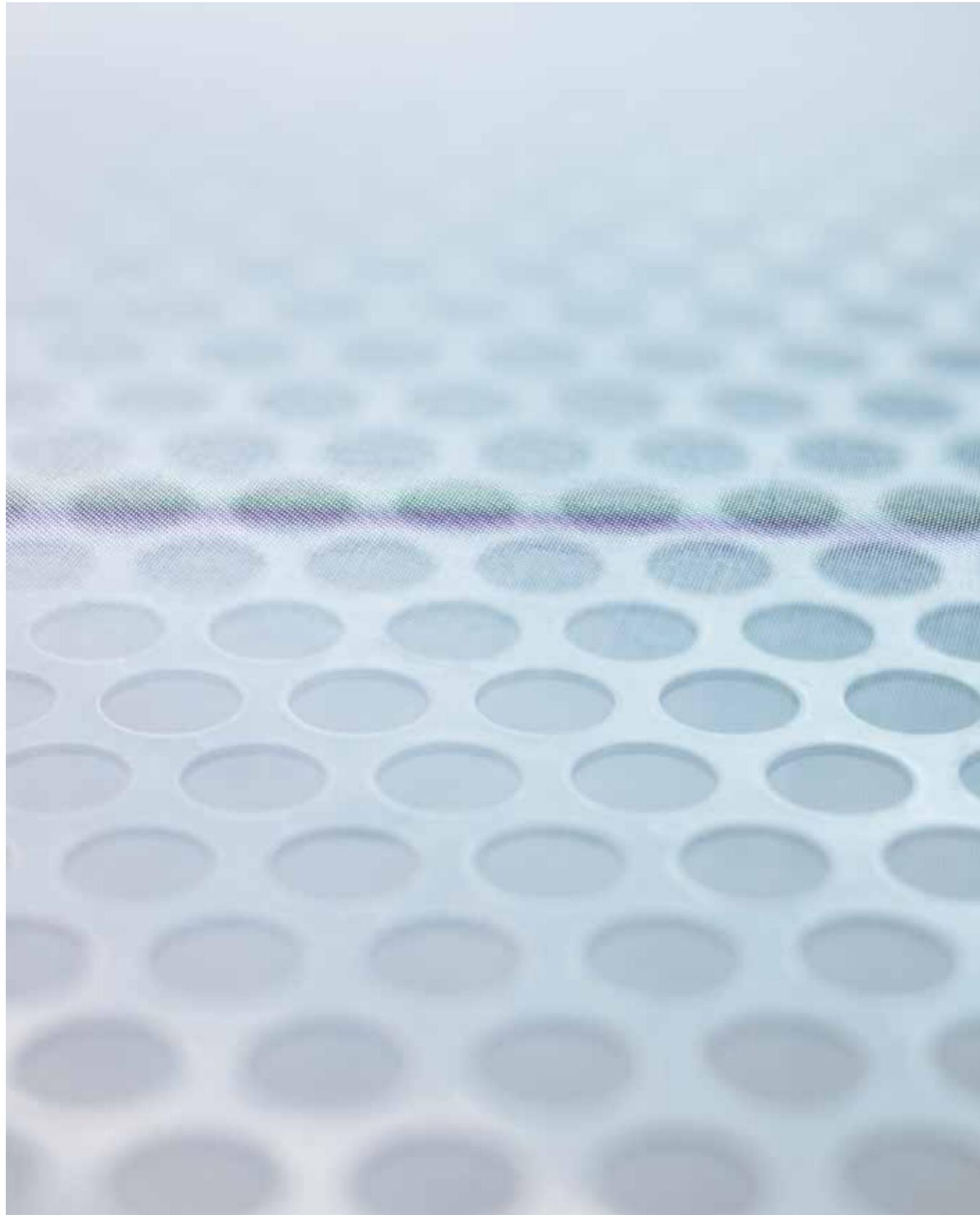
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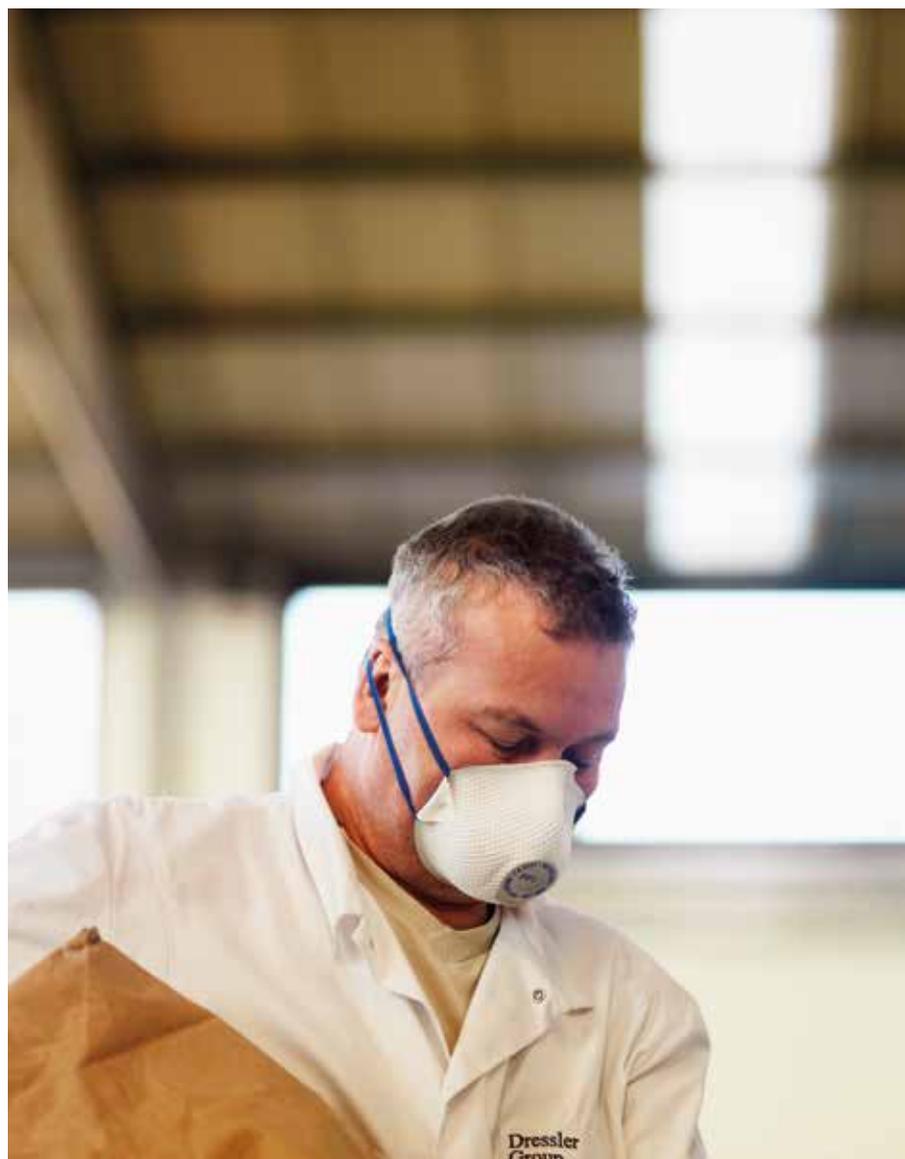
raw material groups

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application procedures







we consider ourselves the partners of our customers. for us, discreetness, loyalty and ongoing communication, eye-to-eye, are par for the course.

#### **Demanding customers**

As a basic principle, highest discretion is a priority for us and will continue to be, as we are working closely with our customers in the very early stages of product development and process optimisation. Chemists and process specialists are working in our dedicated innovation lab on solutions to future product requirements. These cost-effective, certified and reproducible quality processes are highly appreciated by our customers. You can benefit from our know-how and do not need to invest unnecessarily in your own training or lab systems.

Our customers are well-known manufacturers and users of plastics in key industry sectors like chemical, health, aerospace, transport, cosmetics, clothing and 3D printing – basically, wherever the finest plastic powders can be instrumental in improving product properties like durability, or features such as surface coating and gliding capacity, or even just for more effective dosing of raw materials.



Why you, the customer,  
will benefit from our services

Highest process competence

In-house systems engineering

Highest degree of service competence

Innovation lab and consultations regarding product development

Technology centre and test grinding of even the small amounts

Monitored and documented production processes

Flexible production volume

In-transit storage and just-in-time delivery

No fixed plant investment etc.



the dressler group: a strong alliance for innovation, quality and reliability in toll grinding.

#### A strong alliance

Toll grinding of chemotechnical products has been our speciality for almost 40 years. Our plants are conveniently located in Meckenheim, close to the city of Bonn. They are Godding + Dressler GmbH, Linus GmbH and Micro Powder System GmbH.

We are the quality leaders in cold grinding. Our own system engineering makes well over two thousand application procedures possible in our production facilities. In addition to this enormous process flexibility, we also offer a number of finishing steps and service packages, like in-transit storage of your products or just-in-time delivery.

Our innovation lab service designs numerous innovative solutions each year, especially for the new and sometimes complex requirements of our customers. We are able to check the implementation options and their economic effectiveness right here in our fully equipped technical centre. All our services are well-known for their perfect and consistent quality. One of the reasons for this precision is our sophisticated applications, which are of course certified according to international standards. This is also the case with our patented cryo-spray process under clean

room conditions, as well as our certification according to ISO 22000. Furthermore, we operate our plants compliant with GMP and HACCP and hold customer-specific kosher and halal certificates, as well as having been granted FDA approval to produce active pharmaceutical ingredients for the American market.

In close collaboration with individual customers, ISO 22000 was supplemented according to the FSSC standard with a product-specific focus. This includes ISO 22000:2005, ISO/TS 22002-1:2010 and additional FSSC requirements. We work closely with universities and are in permanent communication with our customers. We work on the continuous development of state-of-the-art procedures in our innovation lab and apply them in our own system engineering.

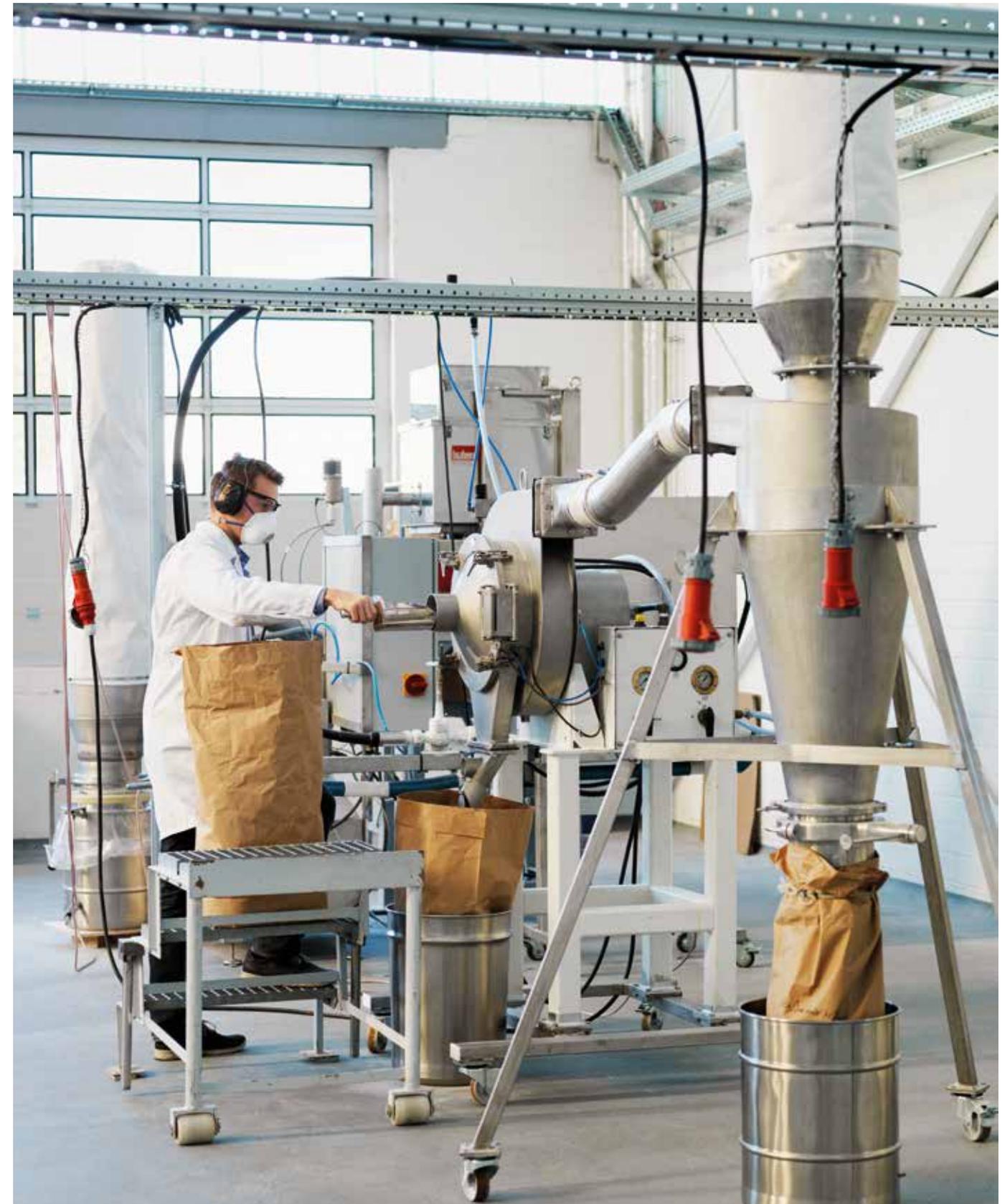
We have been able to produce the seemingly impossible in our works because of our unwillingness to compromise, creating solutions that both satisfy our customers and often exceed their expectations too. This is what keeps us close to our customers. Just as it was almost 40 years ago, this still forms the basis of the lasting relationships with our customers and their ever-interesting requests.





Our process expertise  
at a glance

Cold grinding  
Cryogenic grinding  
Warm grinding  
Inert grinding  
Jet milling  
Compounding  
Sieving  
High share mixing  
Batch mixing  
Mixing  
Individual finishing  
Grinding with little minus material  
Micronising  
Powder spraying  
Patented cryo-spraying  
Fractioning  
Clean room production









the basis of our efficiency is the know-how of our employees, our own system engineering and our state-of-the-art machine park.

#### Taylor-made services

Our state-of-the-art production facilities make the customised processing of the most varied of products possible, such as thermoplastics, elastomers, waxes and chemotechnical products.

Other products, like additives, excipients and active ingredients for the pharmaceutical, food or cosmetic industries, are produced in our specialised plants under strict clean room conditions. Depending on raw materials of the product and the fineness specifications, we can produce in our plants every grain size desired, from the lower micrometre to millimetre range. We work a multi-shift operation to meet requests for quickly processing even the largest quantities of raw materials. This makes us your ideal partner for both long-range and complex processing jobs, as well as just for single orders. Our experienced chemists, engineers and process specialists are currently working in our dedicated innovation lab on the

solutions of tomorrow, so that we can quickly implement your production requirements. Our expertise in the necessary processes and high quality standards will always be the primary prerequisites for exceptional service, such as flexible batch and packaging sizes, in-transit storage and just-in-time delivery.

We have always been completely integrated in the production processes of our customers. This enables us to adjust to their individual work processes, quality assurance requirements, packaging regulations and arrangements, as well as any particular needs that may be important to them. Of course, direct communication with our customers is very important to us in this process. Our experienced consultants coordinate all orders personally and reliably and are constantly in contact via modern communication methods for tasks like coordinating deadlines or any other arising issues.





we rely on tightly controlled quality in our plants, along with our technical know-how and the implementation of state-of-the-art grinding procedures, so that nothing will ever be left to chance.

#### Highest quality standards

Almost 40 years of expertise and experience in toll grinding has resulted in the finest of powders and the highest quality for our customers. Our production is based exclusively on currently applicable procedures and quality and safety regulations.

Working in three shifts, highly qualified employees check around the clock on compliance with these guidelines, as well as on proper and continuous inspection and documentation of all work processes in accordance with the test plans and specifications on record. This applies in particular to our production facilities in the clean room areas. Random sample analyses run in our state-of-the-art lab ensure that the agreed upon quality parameters, like grain size and grain distribution, are reliably maintained during manufacturing. As well as constantly monitoring processes and equipment, intensive training throughout the year will ensure to keep our well recognised quality at its highest level. We are FDA-

approved in some areas of our production and are working according to the current GMP (Good Manufacturing Practice) guidelines.

We are ISO 22000 certified. In close collaboration with individual customers, ISO 22000 was supplemented according to the FSSC standard with a product-specific focus. This includes ISO 22000:2005, ISO/TS 22002-1:2010 and additional FSSC requirements. In addition, we receive confirmation of our compliance with the ISO 9001:2008 on a regular basis. In some of our production areas, we work according to HACCP criteria and are halal and kosher-certified on an individual customer needs basis. Our newest certification in accordance with ISO 50001 has validated our systematic energy management. We are also always available to assist you with a request for an individual customer audit. To us, Best Quality means to produce great things, because we pay attention to even the smallest details. Today as well as tomorrow!



Certificates

ISO 9001:2008

ISO 22000:2005, ISO/TS 22002-1:2010 and additional FSSC requirements

ISO 50001

GMP-compliant plant operation

HACCP-compliant plant operation

Kosher and halal certification for individual customers

Fully inspected and FDA-approved manufacture of pharmaceutical grade active ingredients (API)

GMP inspections according to Art. 11 (5) of the 2001/83/EC Directives, according to Section 64 para. 1 German Drug Registration and Administration Act (AMG)











our passion always begins where the production processes of our customers end: with specialised grinding methods, micronising and cryo-spraying

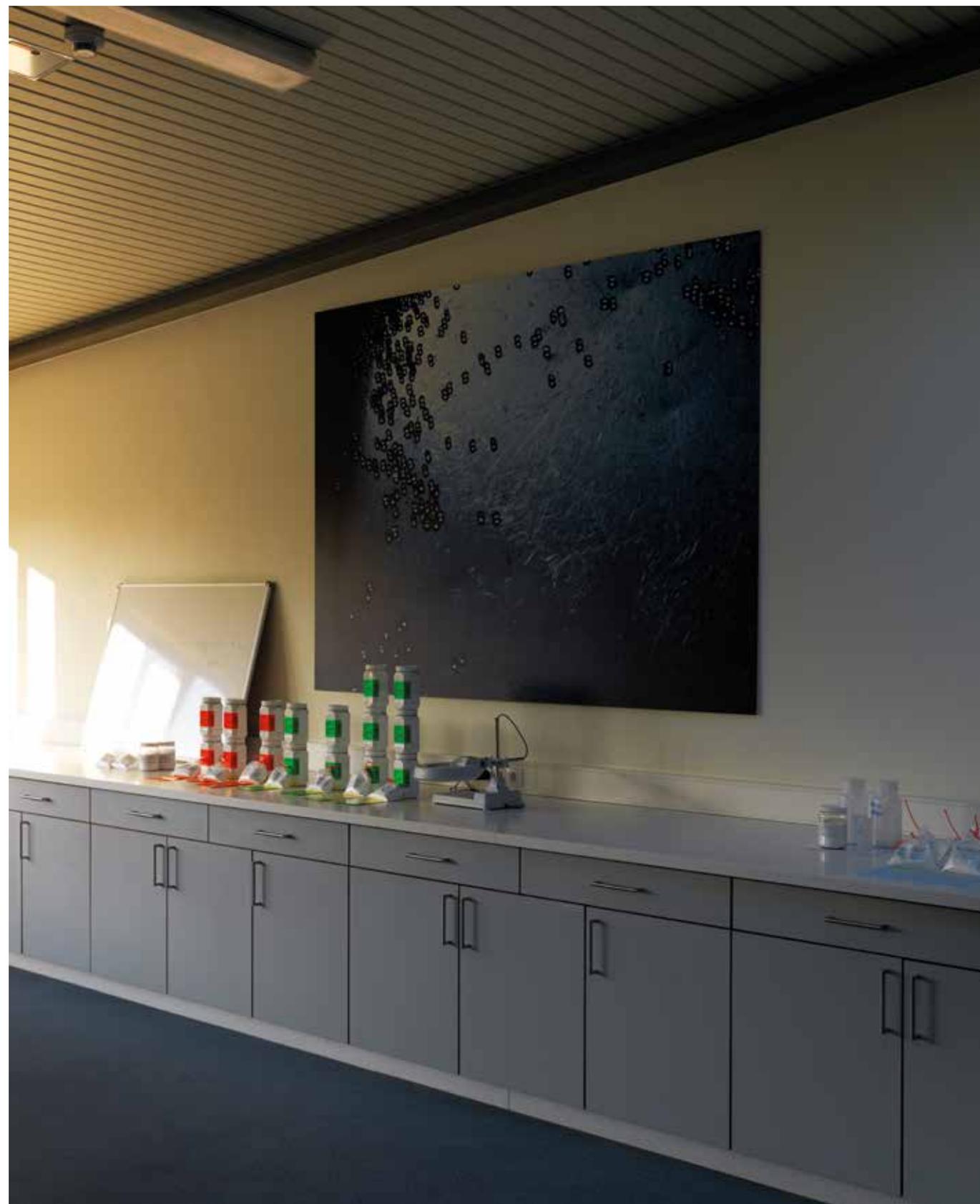
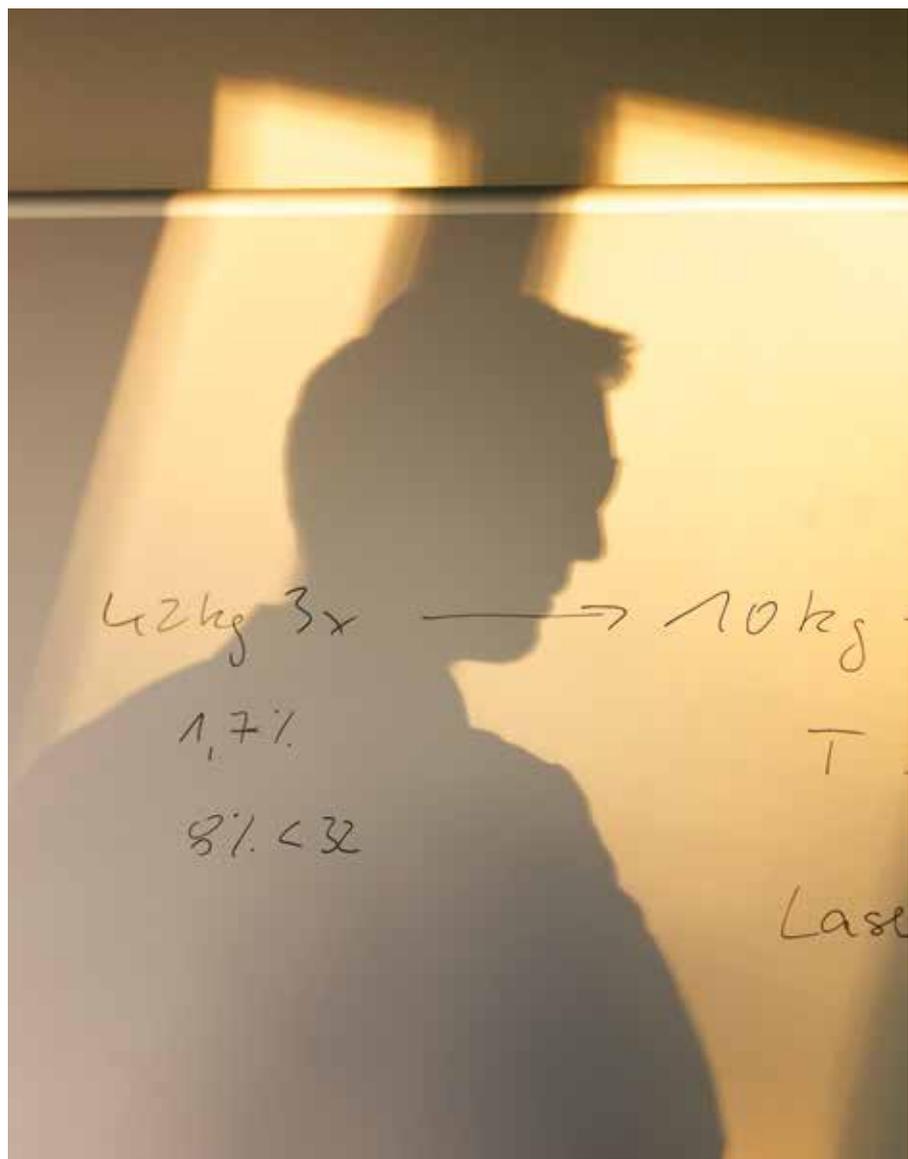
#### **Innovation lab & technical centre**

Plastics and other chemotechnical raw materials play an important role in many product innovations. Improved function quality of a raw material can be of enormous importance for the product optimisation of our customers, for example through improved pourability.

Our internationally active toll grinding facilities are specialists in these individual solutions. Please be assured that highest discretion is a priority for us and will continue to be, as we are working closely with our customers in the very early stages of product development and process optimisation. We work alongside you in our innovation lab to improve your raw material functionalities. Our chemical and process engineers are available on a one-on-one basis for advice, to

facilitate your options in developing and to get familiar with the necessary procedural requirements. This is where we develop the procedures that will produce the exact properties you may need for your products. Our innovation lab therefore also offers meeting rooms and the needed protection against unauthorised access.

All procedures are tested in our technical centre for the desired scalability so that our customers can quickly assess the efficiency of a new procedure's implementation. Our modular systems and our own systems engineering are instrumental in making these quick trial-grinding runs possible. In addition, we allow our customers to use our technical centre for test grinding runs of mini-batches of up to 100 g and for small-batch grinding of up to 100 kg.





Interesting facts about the  
innovation lab & technical centre

### Size

Technical centre: 1000 m<sup>2</sup>, ceiling height approx. 10 m

Innovation lab: 100 m<sup>2</sup>, with large conference room

### Plants

Cryo grinding equipment

Various lab grinders for batches of 100 g up to 100 kg compact grinder

Universal grinder with different grinding inserts and grist size options

Microcutting mill for food applications

Vibrating screen

Tumbler screen

Long-stroke jiggling screen

Twin-screw extruder with water-cooled strand granulation

Spraying systems to crystallise molten material and mixtures

40-litre conical screw mixers

Drum blenders

Mixing granulators



lasting customer relationships are formed for good reasons. they are based on highly qualified employees, uncompromising dedication to quality and the willingness to invest in modern plants and it-equipment.

### Sustainability

Our customers have confidence in our sustainability and integrate our services into their value-added chain. Examples of our daily commitment to create these conditions are:

- › Up-to-date and certified quality standards
- › Greatest process expertise
- › Cost-optimised performance processes
- › Flexible storage and production capacities
- › Absolute commitment to service
- › Innovation and investment capacity

As a family business, we are able to look back on almost 40 years of company history. This is where the roots of our values and guiding principles go back to. For example, the uncompromising commitment to

quality and precision, as well as our complete dedication to service. In addition to these internalised values, we continually invest in the expansion and optimisation of our production, storage and research capacities. We create the ideal platform for servicing currently active along with new markets in the field of toll grinding, by fully utilising customised IT and software solutions, and our state-of-the-art machine park. Last, but not least, our customers appreciate having us a sustainable partner for developing new processes with them, even in the very early stages of product development. In addition to a high level of expertise, we have our own systems engineering capacity to be able to implement newly developed processes with short lead times.











bale breaking  
extruding  
cold grinding with little minus material  
fine grinding  
warehouse management  
multi-stage processes  
micronising  
mixing & homogenising  
screening  
refilling



godding + dressler gmbh combines the innovative power of an internationally active toll grinding plant with the flexibility of a specialist for individual solutions.

#### Godding + Dressler GmbH

The first works of Dressler Group was founded back in 1978 by Herbert Dressler and Hans Godding, his partner at the time. The company is now in its second generation under the management of the brothers Axel and Jan Dressler.

The toll grinding company has been operating for almost 40 years on the international market, combining the high performance of a quality leader in the cold grinding industry with the flexibility of a specialist for precise, individual solutions. The Godding + Dressler GmbH company has specialised in particular in fine powder grinding of high-tech powders made from thermoplastics, TS plastics, caoutchouc, elastomers and chemotechnical products. Products are micronised at normal or low temperatures, depending on the raw material and the powder specifications of the customers' products. We are able to achieve grain distributions to below 50 µm. The variety of combinations of these various additives and processing steps such as pre-breaking, cutting, straining and mixing are all part of our service portfolio, just like trial grinding of even the smallest batches, consultations and in-transit storage of the products.

The results are powders that are ready for your processes. Pre-packaged in bags, cartons, Big Bags and other types of containers.

#### Processes

- › Fine grinding
- › Cold grinding with little minus material
- › Multi-stage processes
- › Bale breaking
- › Mixing and homogenising
- › Classifying/air classifying
- › Screening
- › Refilling
- › Extruding
- › Micronising of small quantities (even under 1 kg)

#### Certificates

- › ISO 9001:2008
- › Warehouse management

cryo-spray pulverisation  
fine & finest powder grinding  
good manufacturing practice  
mixing & screening  
refilling



linus gmbh is well known for its innovative spraying technology in clean room conditions. the company's cryo-spraying technique, patented in 2003, has set significant industry standards.

### Linus GmbH

Linus GmbH was founded in 1998 by Herbert Dressler. The toll grinding facility has since specialised in the particular needs of the pharmaceutical, food and health industries. All production takes place under clean room conditions and in compliance with the highest hygiene standards. Some sections are FDA-approved. Food additives are processed in accordance with the HACCP principles and in compliance with the European food hygiene directives and are prepared for dispatch in GMP warehouses.

Linus GmbH's speciality is powder spraying raw materials in molten form. Processes for high-tech powders of the highest quality are developed here, like applying our patented cryo-spray technique, which is then implemented with our own systems engineering.

#### Processes

- › Fine and finest powder grinding
- › Cryo-spraying technique of molten material
- › Mixing and screening
- › GMP grinding

#### Certificates

- › GMP-compliant plant operation
- › HACCP-compliant plant operation
- › Kosher and Halal certification for individual customers
- › Fully inspected and FDA-approved manufacture of pharmaceutical grade active ingredients (API)
- › GMP inspections according to Art. 11 (5) of the 2001/83/ EC Directive, according to Section 64 para. 1 German Drug Registration and Administration Act (AMG)
- › FSSC-compliant plant operation
- › ISO 9001:2008

#### Patent

- › EU NR 198 13 101

high share mixing  
micronising  
mixing & screening  
jet milling



micro powder system gmbh sets tomorrow's standards today in the field of ultra-fine powder development. close collaboration with our customers in the development process marks the successes of these user-optimised powder systems.

#### Micro Powder System GmbH

Micro Powder System GmbH (MPS) was founded in 1994 by Herbert Dressler, a specialist in micronising high-quality raw materials.

We can produce fineness modules with upper limits under 2  $\mu\text{m}$ , depending on the raw material and its original structure. Polymers micronised at MPS under toll grinding contract are used in the fields of electrostatic thin-film coating, mechanical surface structuring, printing inks and paint additives, bonding technology and composite development, as well as cosmetics.

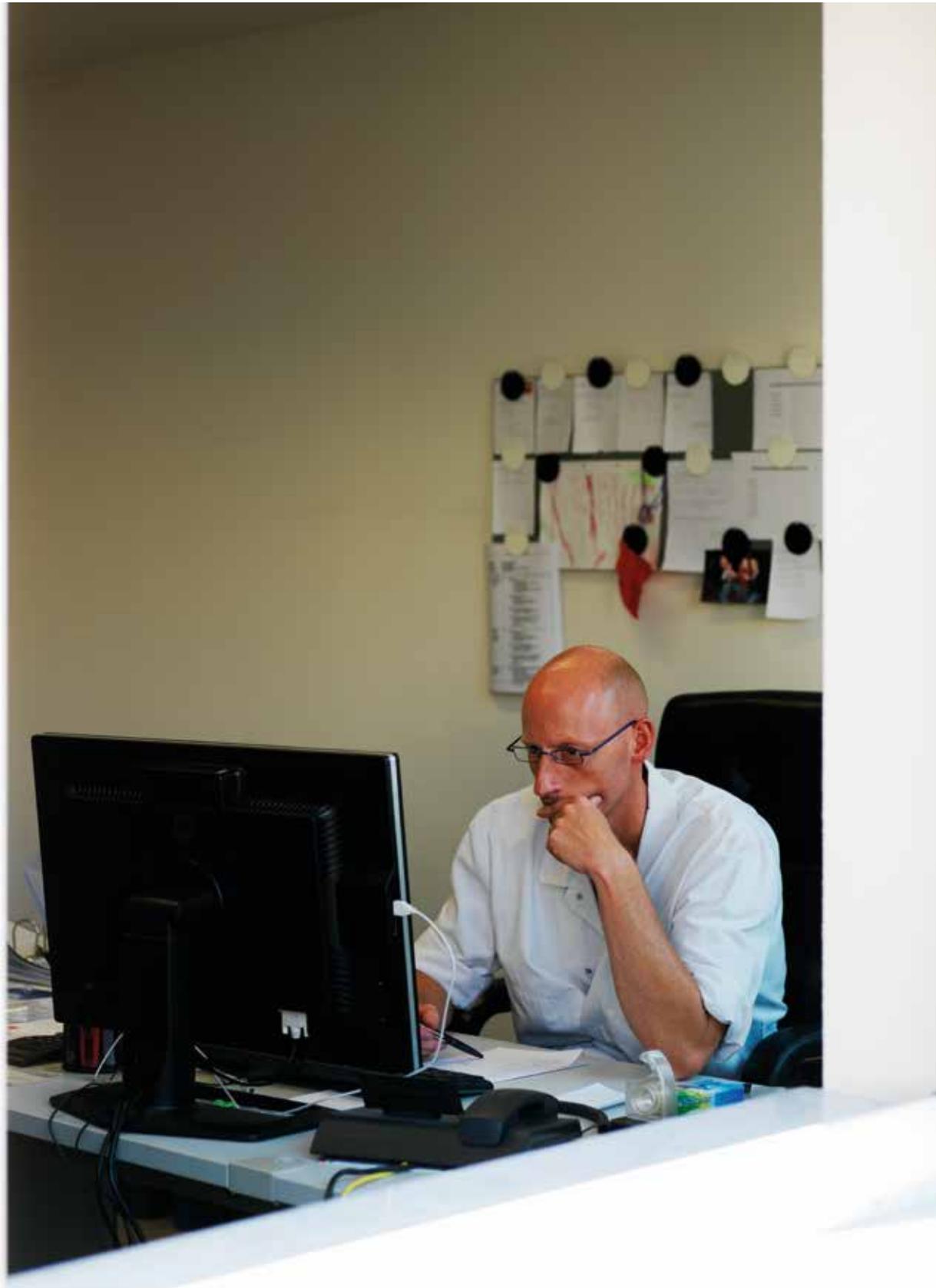
#### Processes

- › High share mixing
- › Micronising
- › Mixing and screening
- › Jet milling

#### Certificates

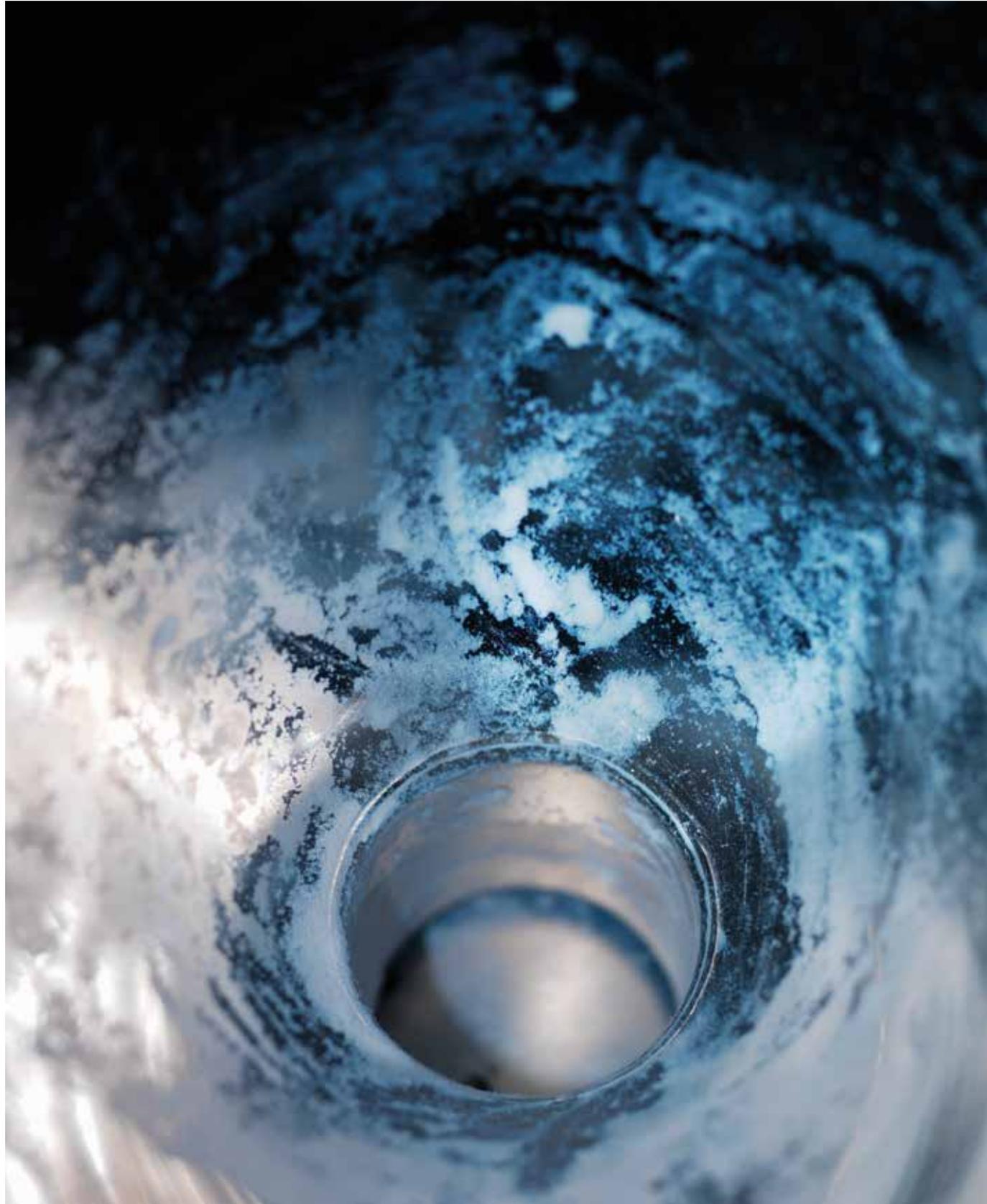
- › ISO 9001:2008
- › Warehouse management











## glossary

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### a

a.02 **Active ingredient carrier**  
→ Pharmaceutical excipient.

a.01 **Actives**  
● Physiologically active components of a medicine. These require particular attention during production  
→ GMP quality inspection.

a.03 **Additives**  
Normally added to products in small quantities in order to improve their qualities (e.g. pourability). The defined dosing of additives into the product is a Dressler Group service.

a.04 **Air jet sieve**  
A sieving unit for determining the → grain size. In principle, this

involves sieving the powder through a sieve of a certain size under a defined negative pressure.

a.05 **Analysis**  
●●● Our analysis laboratory is equipped with state-of-the-art measuring devices such as laser diffraction measuring units, sieving analysis with air jet sieves or vibrating sieves and also moisture detectors, etc. We would also be happy to place our laboratory services at your disposal as an individual service.

a.06 **Audits**  
●●● An element of quality management. An audit carried out by inspectors (auditors) determines the quality status of a company or part of a company. Audits can be carried out or arranged by customers, authorities, certification organisations ( → DQS) or also internally. Audits have been carried out in all

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### b

parts of the Dressler Group for many years.

b.01 **Batch size**  
●●● The Dressler Group processes volumes ranging from tonnes to small quantities.

b.02 **Big Bags**  
Packaging unit for larger bulk material volumes (several 100 kg), often for → bulk goods.

b.03 **Bulk materials**  
●●● Solids that can be poured and that are handled in large volumes in large vessels (containers, bunkers).

#### b.04 **Bulk ware**

Production goods that are processed in large volumes (mostly in large packages) and that are not directly intended for the end consumer.

#### b.05 **Bulk weight**

●●● Also bulk density: Weight per volume of a bulk material (in g/l). This is determined using various standardised procedures.

## C

#### c.01 **Caoutchouc**

●●● Natural rubber or caoutchouc (Indian cao “tree” and ochu “tear”; together “tear of the tree”) refers to elastic polymers that are based on vegetable products, particularly latex. It is mainly used to make rubber by vulcanising. (Source: Wikipedia.)

#### c.02 **Certifications**

●●● Currently: ISO 9001:2008, GMP, halal and kosher.

#### c.03 **Chemical products**

●●● Designation in the dressler group for raw materials that are neither plastics nor foodstuffs nor pharmaceutical products. This is where custom powders and mixtures are developed and made for a broad spectrum of applications down to 20 µm.

#### c.04 **Clean room conditions in accordance with FDA**

● The production rooms in the GMP area must conform to certain cleanness criteria. The particle

concentration in the air must not exceed a certain level, the design of walls and ceilings must be suitable for use in the pharmaceuticals industry, an increased air pressure must be guaranteed in the rooms in order to minimise the ingress of dust. Clean room clothing must be worn for entry into these rooms.

#### c.05 **Clean room production**

Production is done in specifically equipped rooms, to rule out the possibility of product contamination from the outside. This includes, for example: special access authorisation, airtight walls and ceilings, windows that cannot be opened, air supply to the rooms being filtered, higher inside air pressure in relation to the outside air, insect lamps to prevent contamination with insects, mandatory protective clothing, shoe covers, gloves and hair covers, written authorisation with documentation for all work or events taking place in the rooms, such as cleaning, conversions, malfunctions.

#### c.06 **Cold grinding**

● Grinding a product at temperatures below room temperature.

#### c.07 **Company network**

●●● The joint public image of several companies. Joint use of the equipment and staff of these companies.

#### c.08 **Compounding**

●●● Plastics processing through the homogeneous mixing of additives, particularly in → extruders at temperatures above the melting point.

#### c.09 **Confidence**

●●● The most important property

characteristic in the relationship between a customer and the company within the Dressler Group.

#### c.10 **Contract grinding**

●●● Grinding of a substance in return for payment on behalf of a customer, whereby this substance remains the customer’s property in all forms and at all times.

#### c.11 **Crushing/crushing systems**

●●● Grinding systems.

#### c.12 **Cryogenic grinding**

Grinding processes with simultaneous cooling of the raw material to temperatures far below ambient temperature (e.g. minus 30°C); usually done with the help of liquid nitrogen, which has a temperature of around minus 196°C.

#### c.13 **Cryo-spraying system**

● Process for making fine powder systems and composites from low-viscosity melts. With the patented cryo-spraying process CSP, it has become possible to produce highly sensitive products directly from a hot melt to form a solid powder without after-cooling. The entire spraying process is overlaid with nitrogen and also protects very critical substances against oxidation and thermal stress.

#### c.14 **Crystallising**

The formation of ordered molecular structures, e.g. by solidifying a melt.

#### c.15 **CSP cryo-spraying process**

● → Cryo-spraying system.

## d

#### d.01 **Delivery reliability**

●●● Ensuring the agreed delivery volume at an agreed time via suitable measures.

#### d.02 **DIN standards**

●●● “Deutsche Industrienormen” (German Industry Standards) are standardised work directives for many application areas and areas of use. Working to these stipulations means that different manufacturers produce consistent and comparable quality.

#### d.03 **Dispatch**

●●● Collection of the finished products by carriers acting on behalf of the customer.

#### d.04 **Dispersing**

Producing a fine heterogeneous mixture from at least two materials.

#### d.05 **Dissolving agent**

A substance that facilitates or actually makes possible the dissolving of another substance after it has been added.

#### d.06 **Documentation**

●●● Recording of data and events in written form for later reference. Full documentation is important for all stages of an order. All relevant data is documented and archived, from order entry, production, quality assurance to dispatch. This ensures that the individual processes can be traced back.

#### d.07 **DQS certification**

For years, the DQS (“Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagementsystemen” of Frankfurt) has regularly audited the companies of the Dressler Group and issues certificates that confirm adherence to → ISO 9001:2008.

#### d.08 **Duroplast**

●●● Duroplasts are polymers that are produced as a result of a cross-linking reaction in a hardening process from a melt or solution of the components. In most cases, this irreversible reaction is brought about by heating (from which the technical term thermosets is derived), but can also be initiated and accelerated by oxidising agents, high-energy radiation or the use of catalysts. Heating of duroplasts results not in malleability but merely in their decomposition. Hardened duroplasts are mostly hard and brittle, and can only be further processed mechanically in later stages of the production process. This behaviour is due to three-dimensionally linked macromolecules. Due to their mechanical and chemical resistance even at higher temperatures, they are frequently used for electrical installation. One of the most common and oldest plastics in this class is Bakelite. This group also includes polyester resins, polyurethane resins for paints and surface coatings and practically all synthetic resins such as epoxies. (Source: Wikipedia.)

#### d.09 **Dust explosion class**

●●● Categorisation that describes the explosive capability of dust and powders.

## e

#### e.01 **Elastomers**

●●● Elastomers are swellable, non-meltable plastics that are very difficult to dissolve. The elastic behaviour of these plastics is attributable to a wide-mesh cross-linking of the macromolecules. This enables elastomers to immediately return to their original shape even though they deform under compressive or tensile stresses. Whereas so-called conventional elastomers cannot be made to melt, thermoplastic elastomers are certainly malleable at certain temperatures. Typical elastomers are synthetic rubber, neoprene, polyurethane or silicone rubber, whereby it is always necessary to distinguish between natural and synthetic rubber. The importance of this group of plastics in industry is enormous, whereby elastomers are used above all as materials for textiles, seals, all types of tyres and rubber rings. Unlike duroplasts however, elastomers cannot be welded and must instead be joined using special adhesives. (Source: Exika Lexikon.) Here, the specialists from Godding + Dressler work on producing free-flowing granulates by means of bale breaking, then fine powder grinding, followed by mixing.

#### e.02 **Embrittlement**

A material loses its elastic (rubber-like) properties and becomes hard.

#### e.03 **EN 9000-2000/EN ISO 9002**

●●● Old, no longer valid predecessor standards to ISO 9001:2008.

#### e.04 **Extruder**

→ Thermoplastics are often processed in extruders at a higher temperature. After the raw material and, if necessary, the additives are added, they are homogenised with various kneading tools while being continuously heated, and are then pressed out via nozzles. A plastic strand is obtained that is either injected directly into a mould or can be granulated by cutting up after it has cooled down.

## f

#### f.01 **FDA/FDA approval/ FDA certificate**

● The FDA (Food and Drug Administration) is a U.S. authority whose tasks are to monitor foodstuffs and to approve pharmaceutical drugs. It is subordinate to the U.S. Department of Health. Human and animal drugs, biological products, medical products, foodstuffs and radiation-emitting equipment manufactured in or imported to the USA are subject to its compulsory monitoring and supervision. The first FDA-approved cryo-spraying system for macrogol active agents was put into operation on the new premises of Linus GmbH in 2004 and was inspected by the FDA.

#### f.02 **Fine grinding - dry**

●● Fine grinding of dry products is a core competence of the Dressler Group. An extensive range of ma-

chine and system programs are available for this, offering the right solution for almost all applications. Finenesses from 1 µm (d97) and into the millimetre range can be reproduced here.

#### f.03 **Fine grinding - wet**

●● Wet grinding is not currently available in the Dressler Group.

#### f.04 **Fine product**

The finer component of a mixture that drops through the sieve during sieving.

#### f.05 **Flexibility**

●●● A property often demanded by the customer to react extremely quickly and faultlessly to new stipulations, and possibly at even lower prices.

#### f.06 **Foodstuff ingredients**

● Additives or ingredients in foodstuffs.

#### f.07 **Fractioning**

Breaking down of an accumulation/ quantity of particles/powder into smaller quantities with the respective particle size definitions, i.e. by separating/cutting off/straining/ sifting.

## g

#### g.01 **Galenic preparations**

Galenics describes the art of employing methods such as mixing, making capsules or tablets, etc. to put pharmaceutical active agents into such a form that releases the

optimum effectiveness of the substance when inside the body.

#### g.02 **GMP quality inspection**

● GMP (Good Manufacturing Practice) describes guidelines that must be adhered to in order to achieve a certain quality standard. Adherence to these guidelines is monitored by government inspection bodies. Pharmaceutical active agents must be manufactured under GMP conditions. These require significant additional effort in terms of quality, documentation and hygiene. For example, the production systems must undergo a multi-stage quality procedure before they are approved by the responsible authorities for the production of pharmaceutical active agents. Also, it is necessary to prove in validation processes that the production process and the products conform to the necessary quality standards. In addition to the usual → documentation, regular reports (“reviews”) and, if necessary, deviation reports must be written for presentation to customers and the authorities. → Audits are conducted more frequently than is the case with technical production. See also → FDA.

#### g.03 **Grain size/grain size analysis/ grain size distribution**

●●● The grain size distribution reflects the quantity or volume of particles of different sizes in a mixture. In most cases it is an important criterion for the powder quality desired by the customer (powder composition). It can be determined through different processes (→ analysis). The result is mostly shown as a proportion of the powder that is less than a

defined variable (e.g. 20% <100 µm). Several individual values determined in this way give the grain size distribution, which can also be shown as a curve. Using the various processes that are available, it is possible to determine particle sizes of the order of magnitude below 10 µm and into the millimetre range.

#### g.04 **Grain size distribution**

● → Grain size.

#### g.05 **Grinding with little minus material**

Milling with the application of the appropriate technical processes to result in a lower number of fine particles than expected from the size standard.

## h

#### h.01 **HACCP criteria**

● Foodstuffs or foodstuff additives may only be produced under HACCP conditions (HACCP = Hazard Analysis and Critical Control Points). This means that before production starts, a risk and hazard analysis must be performed in order to determine where a drop in product quality can occur during production, before a possible health risk actually arises. This risk can be minimised on the basis of this analysis and by means of the following measures. The recognised “critical control points” at which a possible drop in quality can occur must also be carefully monitored and documented. At

Linus, two production systems with HACCP status are currently operated.

#### h.02 **Health care basics**

● The fundamentals of health care.

#### h.03 **Herbert Dressler**

●●● Herbert Dressler started his career as a graduate mechanical engineer at the Augsburg-based company Hosokawa Alpine AG. There he was involved for the first time in the development of process engineering solutions for the chemicals industry. This was followed by other jobs, for example at MikroPul GmbH in Cologne, before he founded Godding + Dressler GmbH in 1978 with his then partner Hans Godding. By way of innovative process engineering, Herbert Dressler quickly succeeded in making the young company one of Germany’s leading suppliers of services for the contract grinding of thermoplastics, elastomers and chemical products. Herbert Dressler was particularly admired for his uncompromising implementation of the most stringent quality standards, his personal closeness to the customer and his innovative process engineering competence.

#### h.04 **High share mixing**

Mixing process which under the application of high speeds injects enough energy into a powder quantity to create a stable compound from different types of powders and grain particles. Used, for example, for coating surfaces of one type of particle with other particles.

#### h.05 **History**

●●● Description of the past.

#### h.06 **Hygroscopicity**

Hygroscopic = attracts water; hygroscopic products make grinding more difficult. They must therefore be processed in a closed system by rendering the system inert with nitrogen → Inerting of grinding systems.

## i

#### i.01 **Individual finishing**

Flexible, completely customer and product-specific packaging of the end product in a variety of packaging materials and shapes, according to the motto: “The customer is King”.

#### i.02 **Inert grinding**

Grinding whilst simultaneously mixing gaseous nitrogen for reducing oxygen content inside the grinding plant. This diminishes the possibility of an accidental fire or dust explosion.

#### i.03 **Inertising of grinding systems**

The addition of nitrogen to reduce the oxygen content in the air. With products that are sensitive to oxidation or moisture (→ hygroscopicity), the grinding process must be performed with oxygen or water being excluded. This is done by introducing dry nitrogen into the system. Inertising is also necessary when there is a risk of a dust explosion (→ dust explosion class).

#### i.04 **Injection**

Spraying a liquid into a container via a nozzle.

#### i.05 **ISO 9001:2008**

●●● Standard for assessing quality management systems, taking into account customer orientation, responsibilities of the management, involvement of staff, process orientation, supplier relationship and research & development. In the Dressler Group, adherence to the standard is ensured through certification by the → DQS.

## j

#### j.01 **Jet milling**

Grinding process during which compressed air is blown into the grinder under high pressure through nozzles, thereby swirling and crushing the particles.

#### j.02 **Just in time**

●●● Production and material flow along our customers' supply chain, with immediate processing of a product following delivery of the raw products and immediate return delivery of the finished products to the customer (largely without interim storage of raw and finished products). Processing under time pressure.

## k

#### k.01 **Key figures**

●●● Figures that describe a process and that serve to control this process.

## l

#### l.01 **Laboratory**

●●● → Analysis.

#### l.02 **Laser grain size analysis**

A method also used in the Dressler Group in which a laser beam is diverted/redirected (bent) through a particle. The particle size and the particle size distribution can be determined via the amount of deflection (the bending angle).

#### l.03 **Location**

●●● Production location, in this case Meckenheim.

#### l.04 **Logistics**

●●● Transport of the product.

## m

#### m.01 **Machines**

●●● e.g. H grinders, ACM grinders, CW systems.

#### m.02 **Macrogol**

●●● Technical term for (chemical) polyethylene glycol (PEG, which conforms to internationally described requirements for use as a pharmaceutical).

#### m.03 **Materials**

●●● Materials such as stainless steel from which the grinding systems are made.

#### m.04 **Melt**

Raw material for the → cryo-spraying process or product at the discharge of the extruder.

#### m.05 **Melt phases**

Parts with different crystalline properties, e.g. in a plastic.

#### m.06 **Micro jet milling**

● Process for producing ultra-fine powder structures by micronising.

#### m.07 **Micronising**

●●● Crushing the raw product into very fine powders with grain sizes of around 10 µm or smaller.

#### m.08 **Mixing**

●●● Different particles or substances are mixed together or generally moved by mechanical forces until a uniform composition is produced.

#### m.09 **Molecular weight**

The sum of the atomic masses of all atoms in a molecule. For example, water has a molecular weight of 18 g/mole; polymers (i.e. also plastics) have molecular weights that can be millions of g/mole.

#### m.10 **Molecule size**

The size of a substance's smallest substance unit that determines the substance properties in the total.

#### m.11 **Multi-stage processes**

Various successive work steps for one product (e.g. grinding and then mixing, coarse grinding and then fine grinding).

## n

#### n.01 **Nanometre range**

●●● Unit of measure: One nanometre (abbreviation: nm) = one thousandth of a micrometre = one millionth of a millimetre.

## O

#### o.01 **Outsourcing**

●●● Relocation of work from the company to external companies for a fee. Not used in the Dressler Group.

## p

#### p.01 **Packing**

●●● Description for the procedure of filling and preparing the final form for dispatch (e.g. stretching, palleting, etc).

#### p.02 **Patent**

● National or international protection of an invention for sole use by the inventor for a defined period.

#### p.03 **PEG (polyethylene glycol)**

● Polymerised ethyl oxide (→ Macrogol).

#### p.04 **Pharmaceutical actives**

● → Actives.

#### p.05 **Pharmaceutical excipients**

● Additives in drugs that have no pharmaceutical effect. They are added to, for example, produce chemical stability, prevent clumps, press tablets, add colour or flavour, etc.

#### p.06 **Plastic**

●●● Plastics are chemically composed of what are known as polymers, most of which are obtained from mineral oil. Plastics are especially versatile thanks to their properties, e.g. extremely durable, flexible, insulating, non-rusting, watertight, etc. Plastics do not degrade and rot like organic materials. Because of the different chemical structure of individual plastics, the usual recycling into a new (high-quality) material is difficult. Recycled plastics can therefore often only be used as insulating and lagging materials.

#### p.07 **PLC system**

Programmed electronic control system.

#### p.08 **Polymer**

A combination of several smaller molecule units (monomers) to form large molecules. Plastics are polymers.

#### p.09 **Pourability**

●●● Pourability is often important for the further processing of the powder on the customer's premises. It is tested by the "pour test" in the laboratory.

#### p.10 **Powder/powder structure**

●● The properties of the powders made by the Dressler Group are normally specified by the customer. These include for example pour-

ability, bulk density, fineness, moisture, additive content. The desired powder form or powder property determines the system with which the powder is then produced.

#### p.11 **Powder coating**

→ Surface coating.

#### p.12 **Powder spraying**

● Making powders by spraying a liquid/melted substance through a nozzle, followed by simultaneous cooling.

#### p.13 **Precision**

●●● Accuracy.

#### p.14 **Process/process engineering**

●●● Refers to the processes between production of the raw products and product finishing.

#### p.15 **Processes/process optimisation**

●●● Improving described procedures.

#### p.16 **Production/production chain**

●●● The creation of a product from the raw material to the end user.

#### p.17 **Purity requirements**

●●● Description of cleanliness and quality criteria, mostly in relation to impurities.

## q

#### q.01 **Qualified personnel**

●●● Staff who are sufficiently well trained for a particular purpose.

#### q.02 **Quality**

●●● Product properties that must

be kept constant in accordance with previously defined descriptions. The quality of the products made at the Dressler Group has the highest priority. All relevant processes and procedures are described and defined in the Quality Management Manual.

#### q.03 **Quality Assurance Management**

Organisation of the highest quality management position in a pharmaceutical company.

## r

#### r.01 **Raw materials**

●●● Substances that are supplied for processing.

#### r.02 **Recycling**

●●● Recycling is not done as contract work in the Dressler Group.

#### r.03 **Refilling**

Change of packaging for already packaged products, usually commissioned by the customer (e.g. bag/Big Bag, small pallet/large pallet).

#### r.04 **Reproducibility**

●●● Creating consistent/constant properties in a process.

#### r.05 **Rotational casting**

●●● Not offered in the Dressler Group.

## S

#### s.01 **Sampling**

●●● For the purpose of quality control in the laboratory or also at the customer's request, a powder sample is very often taken from one or more containers during production. The sampling should be done in such a way that a homogeneous and representative sample is obtained. Staff must receive intensive training for this activity.

#### s.02 **Service**

Our customer service is geared to be flexible and responsive to customer requirements.

#### s.03 **Side seam coating powder**

The finest powder, which can be processed pneumatically in spraying systems. Used for coating soldered seams on food/conserved cans to prevent corrosion.

#### s.04 **Sieving**

●●● Method for determining the grain size; → air jet sieve, → vibrating sieve, but also used in a production system for separating the coarse component of a powder so as to obtain the desired → grain size distribution.

#### s.05 **Sifting/classifying**

●● Using acceleration to separate particles of different weights and therefore mostly different sizes.

#### s.06 **Spray crystallisation**

● → Cryo-spraying system.

#### s.07 **Spraying tower**

The part of the → cryo-spraying system in which solidification of the melt droplets occurs.

#### s.08 **Standards/standardisations**

●●● → DIN standards.

#### s.09 **Storage capacity**

●●● Total available area for storing raw materials and finished goods.

#### s.10 **Surface coating**

●●● Can be done using very fine powders from Dressler Group companies in painting processes on the customer's premises.

## t

#### t.01 **Technologies**

●●● Technical possibilities for achieving a production target.

#### t.02 **Test certificate**

●●● On request and after the order is completed, the customer receives a test certificate in which the results of the quality tests and the analysis methods used are documented.

#### t.03 **Tests/testing plans**

●●● Within the quality control framework, suitable quality tests and testing intervals are defined for each powder in collaboration with the customer and are documented in the test plan.

#### t.04 **Thermoplastics**

●●● Thermoplastics are one of the three main groups of plastics. They

are easy-to-melt polymer materials with good swelling properties that are comprised of carbon chains that are either weakly branched or not branched at all. These are interconnected only by means of weak physical bonds. A distinction is made between "softening" (= amorphous structure) and "melting" (= partially crystalline structure) thermoplastics. When several different thermoplastics are mixed, we refer to "polyblends". Typical thermoplastics include: polyethylene (PE), polyvinyl chloride (PVC), polystyrene (PS), polyamides (Nylon, Perlon), polyesters (Trevira), polyacrylonitrile (Dralon) and the group of polycarbonates (Macrolon). Godding + Dressler specialises in fine and ultra-fine grinding down to 63 µm. We produce powders for compounding, rotational casting and whirl sintering, as well as high-performance powders for electrostatic surface coating and textile bonding.

#### t.05 **Toxicity**

No toxic products are processed in the Dressler Group.

#### t.06 **Tradition**

●●● Derived from the → History and must not be confused with the inalterability of old, cherished methods.

#### t.07 **Trial grinding**

●●● Grinding small volumes of a product for test purposes.

#### t.08 **Turbidity measurement**

●●● Nephelometry: Standardised method of determining the cleanliness (turbidity) of a solution by

measuring the scattered light. Turbidity measurement is used in, for example, the quality testing of macrogols.

## V

#### v.01 **Vibrating sieve**

● In contrast to the → air jet sieve, sieving is achieved by mechanical movement of the sieve.

#### v.02 **Viscosity**

●● Measurement of a liquid's flow behaviour. Low viscosity = good flow behaviour; high viscosity = poor flow behaviour. Important in → cryo-spraying and extruders.

## W

#### w.01 **Warehouse management**

Organisation and management of all warehouses for an efficient flow of goods.

#### w.02 **Warm grinding**

●● Grinding at or above room temperature.

#### w.03 **Water analysis**

Systems may only be cleaned with drinking water the quality of which is monitored by the municipal water authority.

#### w.04 **Whirl sintering**

● Not currently offered by Dressler Group companies.

#### Legend

- godding + dressler gmbh
- linus gmbh
- micro powder system gmbh



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