



IT ALL DEPENDS ON THE GRINDING.

PERFECT PREPARATION FOR PET FOOD AND FISH FEED

02 | TJETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY

MILLING GOOD, EVERYTHING GOOD!

Producing an optimal feed for each species at each stage of development is a major challenge for the feed industry. In recent years, many processes have been developed that contribute to today's food quality. But what are the challenges of tomorrow?

In order to continue producing the best possible products in the future, special attention must be paid to every technical detail at the beginning of the process chain. The grain structure and fineness achieved by the grinding process are of decisive importance to achieve the desired quality. Finally, the key nutritional-physiological ingredients must

be maintained at all times, in every place, for each extrudate, for every small pellet. So, the nutritional requirements for pet food differ significantly from those of farm animals.

The receivables are:

FOR PETS

- Product diversity
- Smell
- Shape
- Colour



- Ingredients
- Digestibility
- Acceptance by the species
- Form stability
- Durability



- Feed conversion ratio
- Sink and swim behavior
- Environmental compatibility of the residues

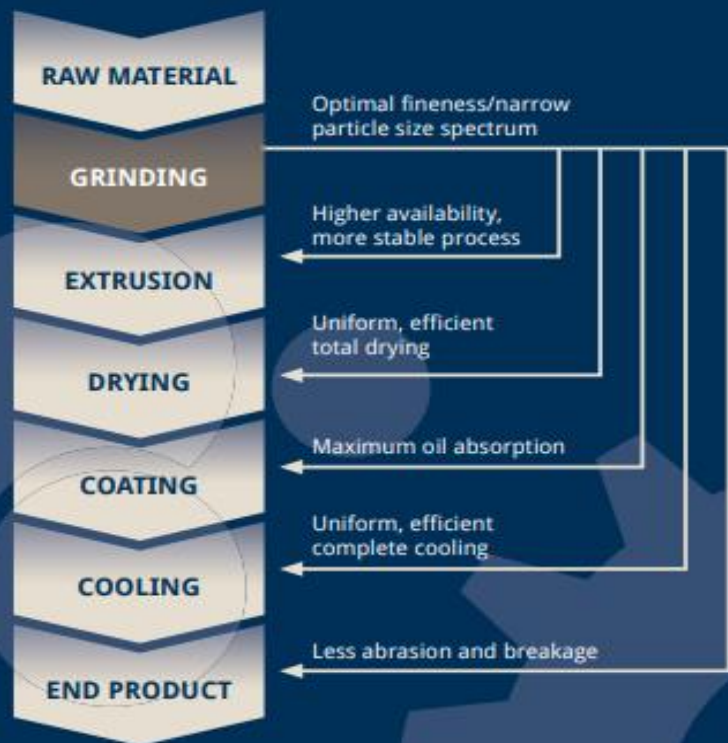
FOR FISH AND SHELLFISH



The grinding process has the same function as chewing. It is at the beginning of food intake and makes the food first usable and digestible by comminution. Good grinding results in a uniform grist and is a prerequisite for the utilization of the ingredients.

Starting with the performance specifications of the end product, we determine the required production steps. The optimal configuration of the grinding system is of fundamental importance for the smooth and therefore economical operation of the entire production process.

A guaranteed grist and reliably cleaned material at the extrusion interface avoids extruder down times, ensures energy efficient drying and cooling as well as optimum oil absorption in the coating process. This in turn has positive effects for the packaging process and storability of the feed.



„WHAT MUST BE CONSIDERED IN PLANT PLANNING?“

FRAMEWORK CONDITIONS

- Climate at the site
- Availability of raw materials
- Energy and waste management
- Onsite logistics and infrastructure
- Operator qualifications

CUSTOMER REQUIREMENTS

- Profitability of the investment
- Operational costs
- Plant performance and availability
- Flexibility of plant utilization
- Operational security and health and safety at work

TIETJEN – SYSTEM COMPETENCE

THE RIGHT COMBINATION BRINGS THE BEST RESULTS.

A SECURE FUTURE

Good advice is part of the first thoughts about the future. We will gladly clarify the possible future conditions in the run-up to a project. What future changes are expected in the commodity markets, e.g. Use of genetically modified biomass? What legal guidelines are to be taken into account, e.g. regarding the protection of the workplace? What are the sales markets of the future? How will product requirements change, e.g. regarding product hygiene? Which of the anticipated changes are to be already taken into account today in the plant concept?



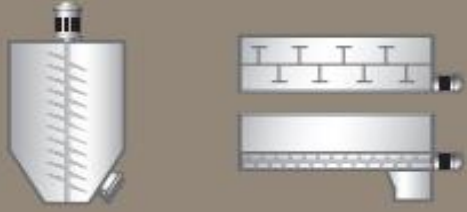















INDIVIDUALITY

Each plant is optimized. We analyze the customer requirements and specify an individual process diagram. The perfect grinding system; unique, reliable, designed for the future, is the result of the combination of precisely matched individual components.



TRANSPARENCY OF COSTS

If you are asking for a performance reserve or extraordinary high flexibility, we know the options and can relate them to the future operational costs in your plant. This is what our customers need for a clear long-term investment decision. Moreover, we assess the costs in subsequent steps and related technical sections, costs for service, maintenance and wear parts. You should always expect a total cost of ownership perspective from us – from concept and engineering to the last year of operation of our machines. Our project teams are small and work closely with our customers. They guarantee a direct information flow. At TIETJEN, we traditionally practice "all our hands for the next project, but only one face to the customer".

<p>Horizontal-/Vertical-Pre-Mixer</p>			<p>ASPIRATION</p>			
<p>Pre Grinding</p>			<p>Fan</p> 			
<p>Feeding System incl. foreign body separation</p>	<p>Air-Gravity-Separator</p> 	<p>Vibration feeder</p> 	<p>Bag- or Pocket Filter</p> 			
<p>Fine grinding</p>	<p>Large chamber grinders GD/GDL</p> 	<p>High speed grinders VDK/LDE</p> 	<p>Gap mills GM</p> 	<p>Impact-Classifer Mill</p> 		
<p>Underhopper</p>	<p>Underhopper with mechanical discharge</p> 		<p>Pneumatic Discharge</p> 	<p>Total-Separator</p> 		
<p>Sifter</p>	<p>Plansifter</p> 			<p>Tumble Screen</p> 		

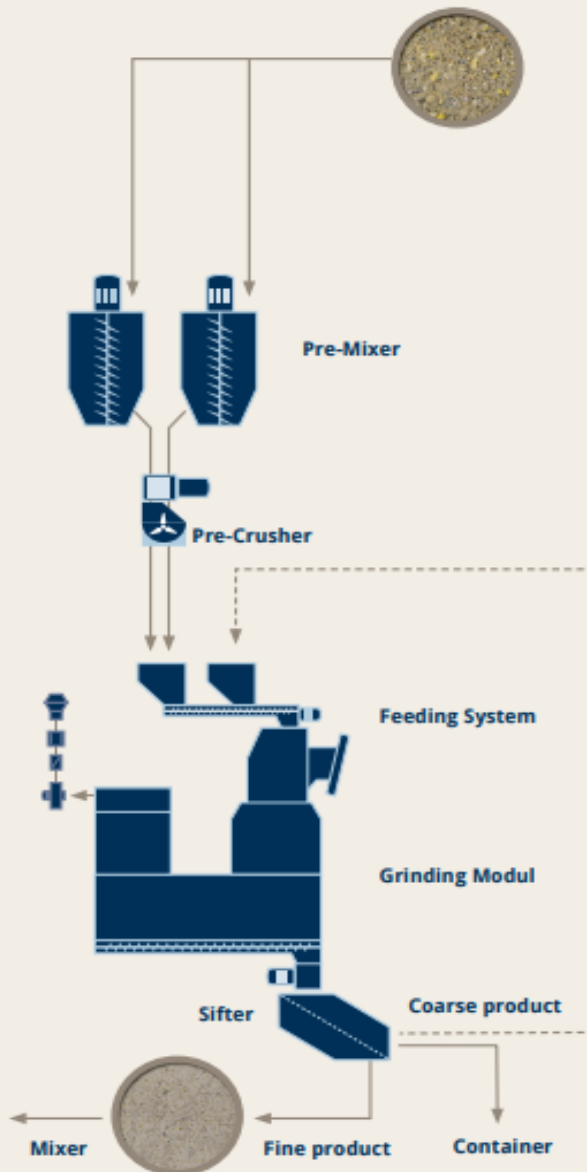
06 | TIETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY

TIETJEN - SYSTEM COMPETENCE

OUR CONCEPTS FOR YOUR REQUIREMEN

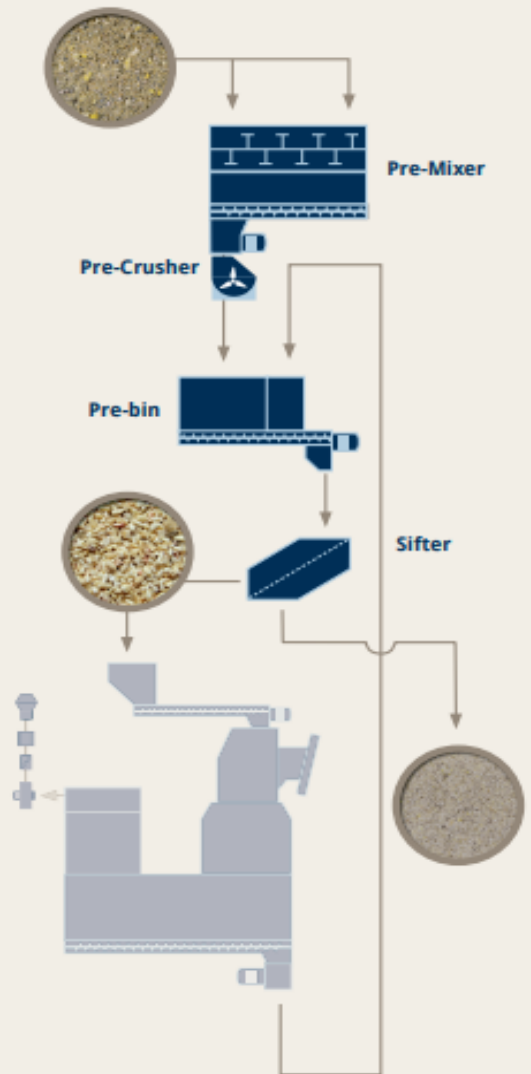
FINE GRINDING

- Slim system design with few drives
- Foreign body protection in front of extruder or pellet press
- Maximum system flexibility



EXTRA-FINE GRINDING

- Additional advantages:
- Fine grain size guaranteed
 - reduced specific energy requirement

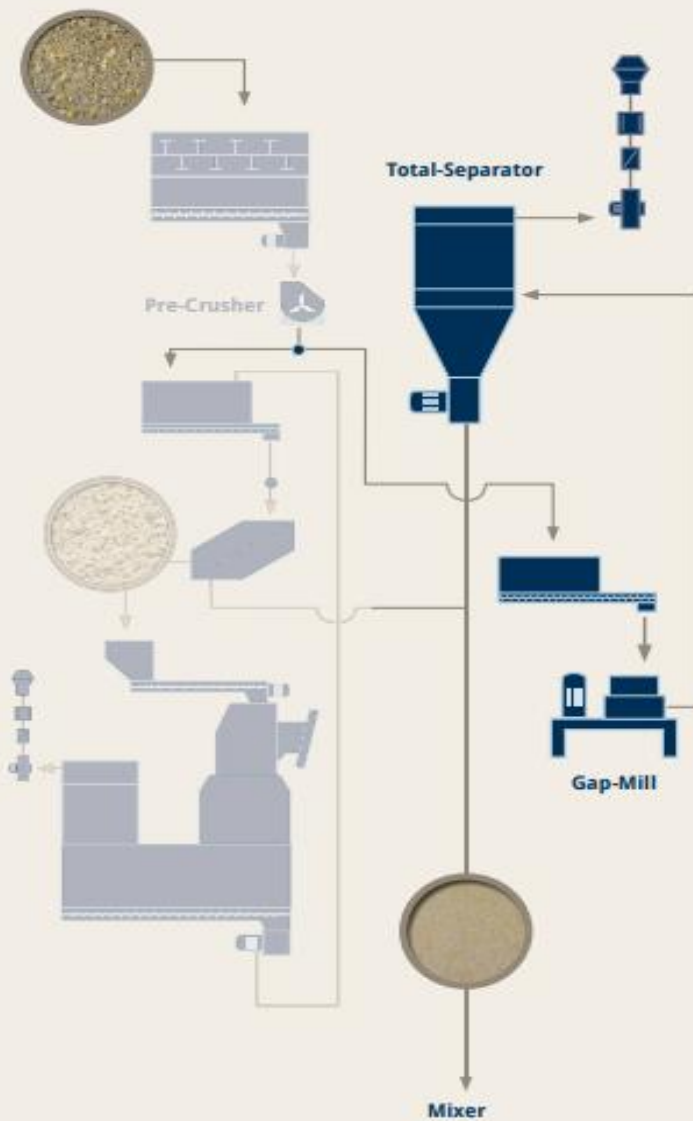


TS.

SUPER-FINE GRINDING

Additional advantages:

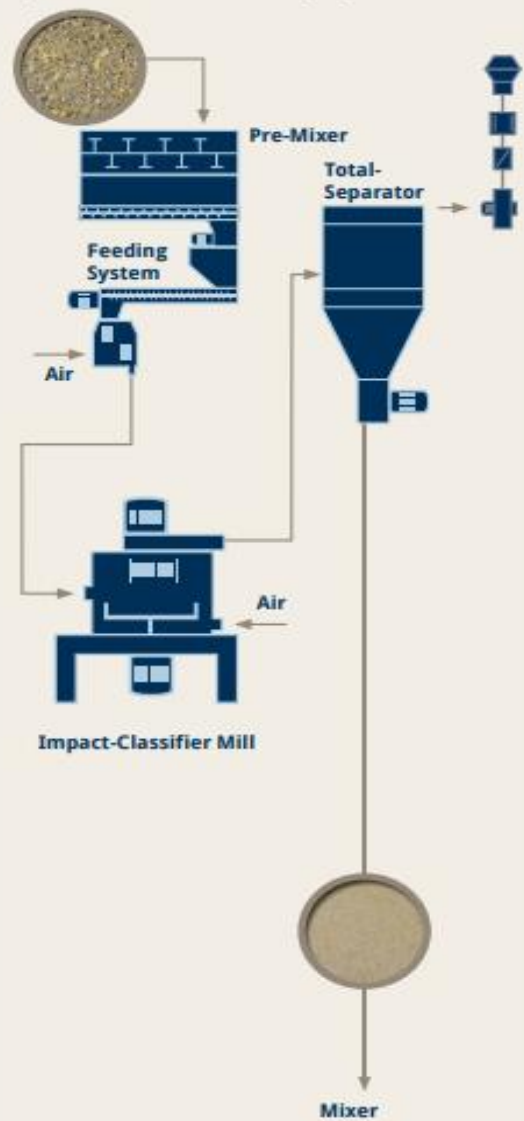
- Particularly fine, uniform grain structure
- Masters extreme recipe requirements



SUPER-FINE GRINDING WITH INTEGRATED CLASSIFIER MILL

Additional advantages:

- high fineness and grist spectrum-definition
- super-fine classification
- particle size distribution flexibly adjustable



08 | TIETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY

TIETJEN - GRINDING TECHNOLOGY

PERFORMANCE-ORIENTED DOWN TO THE LAST DETAIL.

Feed recipes are ground efficiently when the following parameters of the grinding system are in harmony.



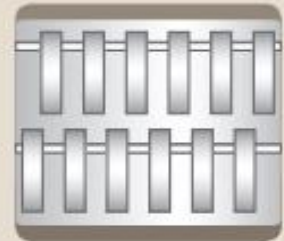
Load dependent dosing of the raw material into the grinder



Chamber load, i.e. relationship between grinder size and drive power



Grinder chamber design, especially at the impact zones



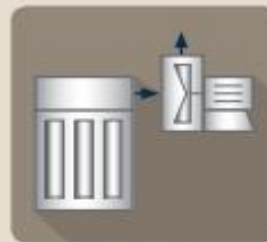
Hammer configuration in relation to screen width



Energy input, i.e. tip speed/peripheral speed of the tools



Screen configuration, i.e. relationship between perforation, screen size and plate thickness



Aspiration and dust separation of a system



Distance between hammer and screen

The grain structure is mainly determined by the energy input, the beater configuration and the beater peripheral speed. The sieve only limits the maximum grist size.

The beater tip speed is calculated by the motor speed and the rotor diameter.

High Speed Mill VDK/LDE = 104–124 m/sec
 Large Chamber Mill GD/GDL = 94–112 m/sec

TIETJEN – GRINDING TECHNOLOGY

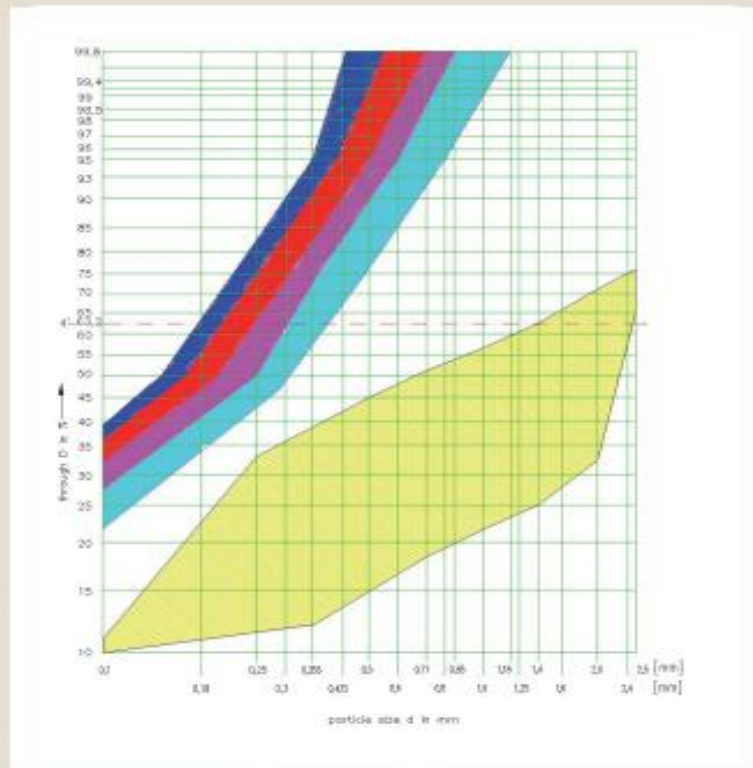
WE PAY ATTENTION TO THE SUBTLITIES.

POSSIBLE GRAIN SIZE DISTRIBUTION

The diagram shows the possible particle size distribution with sieves with 0.8–1.5 mm perforation and a beater peripheral speed between 100–124 m/sec.

- Raw material (premix)**
- 0.8 mm screen, free screen area: 34 %**
 Possible grain size*
 D50: 160–140 µm
 D95: 400–355 µm
- 1,0 mm screen, free screen area: 30 %**
 Possible grain size*
 D50: 200–160 µm
 D95: 500–450 µm
- 1,25 mm screen, free screen area: 35 %**
 Possible grain size*
 D50: 250–180 µm
 D95: 600–500 µm
- 1,50 mm screen, free screen area: 33 %**
 Possible grain size*
 D50: 300–240 µm
 D95: 800–700 µm

D50 = (50% is finer than)
 D95 = (95% is finer than)



WE OFFER A TEST GRINDING

You supply approx. 100 kg of your feed formula and we determine the data on our test mill, such as energy needs and particle size distribution, for optimum plant design.



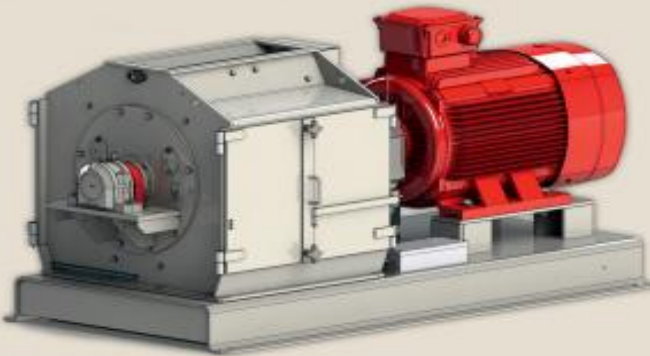
*Based on typical fish feed/dog food recipes/premix with max. 8% fat incl. „Rework“. This data is intended as a guideline, which may vary depending on the recipe, origin and quality of the raw material.

10 | TIETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY

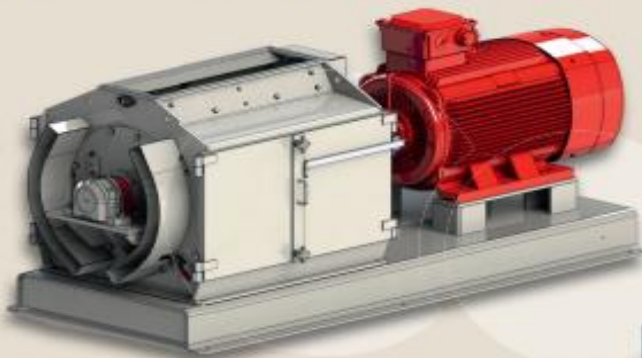
TIETJEN - GRINDING TECHNOLOGY

A SUITABLE MILL FOR EVERY PLANT.

HIGH SPEED GRINDER - TYPE VDK



HIGH SPEED GRINDER - TYPE LDE



HIGH SPEED MILL - TYPE VDK/LDE

The High-Speed Mill, the robust series machine for medium throughput performance

- Optimized for fine grinding
- Symmetrical chamber, allows operation in both rotational directions
- Hardened inlet flap with proximity switches for to change sense of direction
- Hardened impact plates on both sides of the inlet
- Foreign body catch trap inside the grinding chamber, easy to clean
- Door lock with standstill monitoring
- Tested and certified in shock-resistant and flame-proof design, ATEX category II 3 D, shock resistance 0,4 bar

TYPE VDK

- 2 screen segments, screen change without tools while the machine stands still

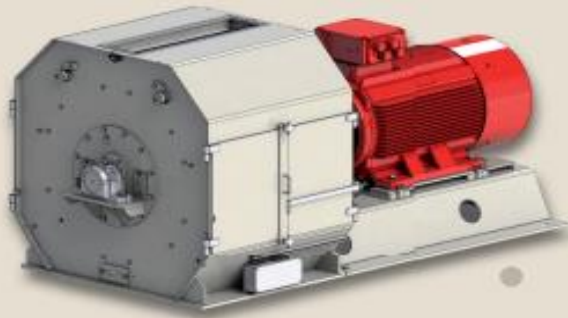
TYPE LDE

- 2 screens segments fitted in frames, semi-automatic screen change by running rotor

GRINDING CAPACITY/ SCREEN PERFORMANCE		0,8-1,5 mm Ø	1,0-1,75 mm Ø
Mill Type	Grinding Chamber	Fish Feed	Petfood
VDK 7/LDE 7	1,18 m ²	3-9 t/h	4-7 t/h
VDK 9/LDE 9	1,54 m ²	4-12 t/h	5-9 t/h
VDK 13	1,90 m ²	5-15 t/h	7-12 t/h

TJETJEN – FOR THE PET FOOD AND FISH FEED INDUSTRY | 11

LARGE CHAMBER GRINDER – TYPE GD



LARGE CHAMBER GRINDER – TYPE GDL



GAP MILL – TYPE GM

A super fine grinding mill, the rugged special machine designed for very fine grinding and pneumatic discharge

- Optimized for grinding 100% <200 µm
- Operates without screen
- Fineness flexibility through an adjustable grinding gap and variable speed
- Dust tight design
- Tested and certified in shock-resistant and flame-proof design, ATEX category II 3 D, shock resistance 10 bar
- 3 sizes, capacity from approx. 500 kg/h to 2000 kg/h



LARGE CHAMBER MILL - TYPE GD/GDL

The Large-Chamber Mill, the power pack for maximum throughput

- Optimized for fine grinding
- Symmetrical chamber, allows operation in both rotational directions
- Hardened inlet flap with proximity switches for to change sense of direction
- Hardened impact plates on both sides of the inlet
- Foreign body catch trap inside the grinding chamber, easy to clean
- Special rotor design, run down time <6 minutes without breaks
- Hammer changes in a few minutes by a beater-frame-system (Cassette exchange)
- Automatic door lock with stand still monitoring Tested and certified in shock-resistant and flame-proof design, ATEX category II 3 D, shock resistance 0,4 bar

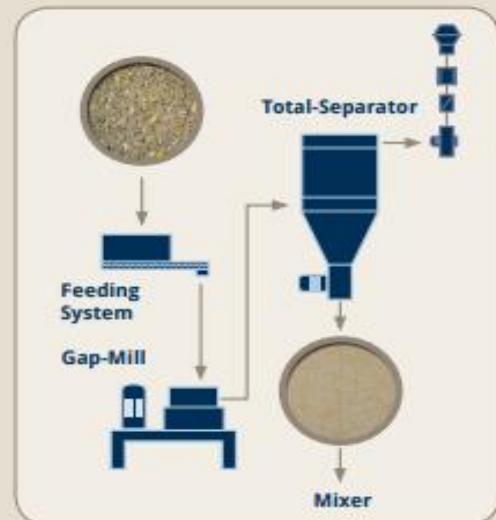
TYPE GD

- 4 screen segments, screen change without tools while the machine stands still

TYPE GDL

- 6 screens segments fitted in frames, semi-automatic screen change by running rotor

GRINDING CAPACITY/ / SCREEN PERFORATION		0,8 - 1,5 mm Ø	1,0 - 1,75 mm Ø
Mill Type	Grinding Chamber	Fish Feed	Petfood
GD/GDL12	1,84 m³	4,5 - 15 t/h	7,7 - 12,8 t/h
GD/GDL20	2,88 m³	7,2 - 21 t/h	12 - 20 t/h
GD/GDL25	3,60 m³	9 - 25 t/h	15 - 25 t/h

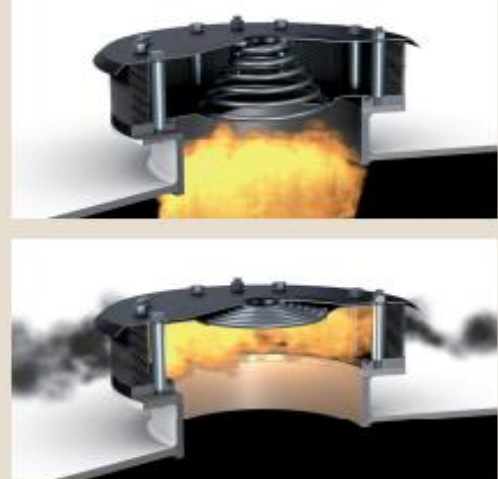


12 | TIETJEN – FOR THE PET FOOD AND FISH FEED INDUSTRY

TIETJEN-DUST-EXPLOSION PROTECTION CONTROLLED SAFETY.

It is through our own research and development of pressure relief systems, that grinding systems are safer today. All of our machines and equipment are explosion proof and flame resistant and designed for reduced explosive overpressure of at least 0.4 bar. Tietjen safety technology fulfills the necessary safety requirements and is delivered with EC-Declaration of Conformity according to ATEX Directive 2014/34/EU.

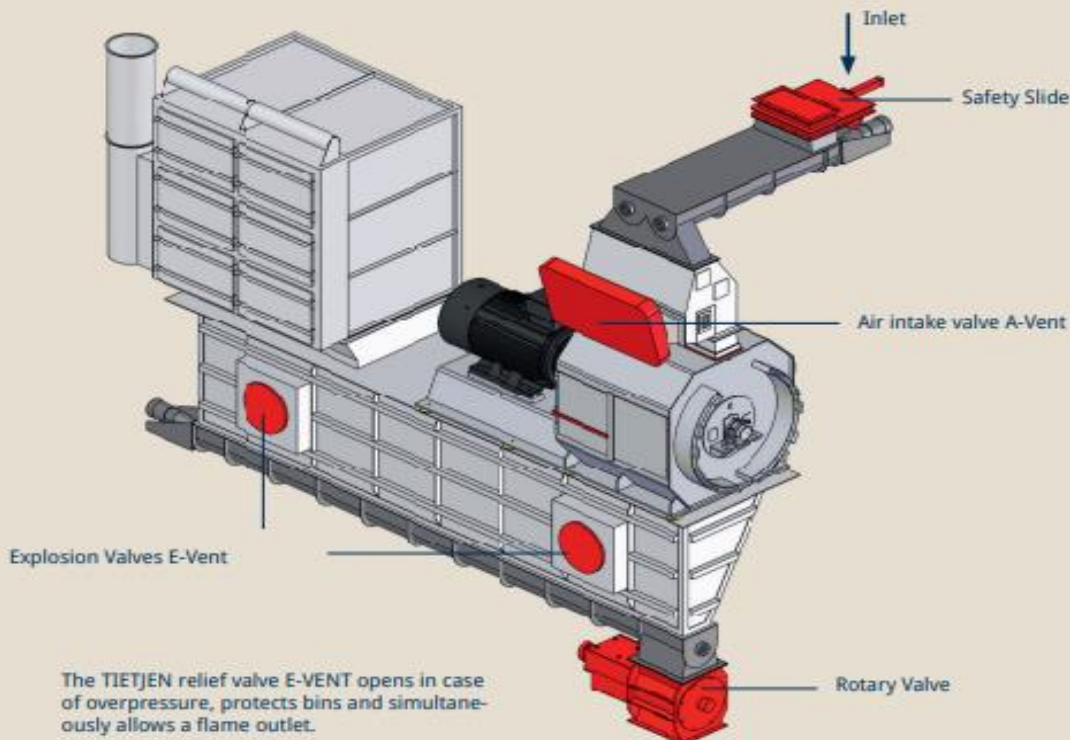
Today, legislators and insurance companies are increasingly demanding a clearly structured and clearly documented explosion protection concept. According to local laws and policies, devices and protective systems, as well as safety, control and regulation devices, which have a safety function, must be checked within 3 years, by a qualified person or specialist company.



We stand at your side from the beginning with advice and action:

- Inspection and analysis of your system
- Classification of your entire facility in zones
- Joint development of your concept
- Preparation of the required documents
- Negotiation with the competent authorities

Protocols and work instructions, developed together with partners, help us and you with the competent preparation of documentation for the authorities or internal departments. Through periodic inspections and maintenance of the safety devices we ensure that they function permanently.



The TIETJEN relief valve E-VENT opens in case of overpressure, protects bins and simultaneously allows a flame outlet.

TIETJEN – SERVICES

WE WON'T KEEP YOU WAITING.

Many years of experience and innovative thinking are the basis of our services. For individual international projects we rely on a network of reliable and powerful partners.

MAINTENANCE & REPAIRS

Our experienced installation team performs reliable, on time service and repair of your equipment on-site or in our workshops. Our aim is to keep your production downtime to a minimum. Therefore, the work will frequently take place at weekends. For long-term reliability, we offer a periodic inspection, which is contractually agreed and guarantees a reliable and robust documentation. Of course, you can also count on us in case of emergencies.

SPARE PARTS SUPPLY

A significant part of our business is the supply of consumables and spare parts. Deliveries are made from our central warehouse in Schleswig-Holstein (Germany) usually within 48 hours of order, in case of an emergency, even faster. We ship worldwide with selected reliable freight forwarding and courier services. We are happy to obtain any external parts for you at short notice.

We guarantee the availability of spare parts for at least 20 years.



CONCEPT 1: ONETIME INSPECTION

- Inspection of the System
- Qualified Report
- Recommendations for Action
- Implementation



CONCEPT 2: IMMEDIATE MAINTENANCE

- Combined Inspection and Maintenance
- Provision of spare parts
- Replacement of parts, if required



CONCEPT 3: ROLLING INSPECTION

- Inspection at fixed intervals
- Regular scheduled maintenance.



YOUR DECISION

We are happy to arrange an individual maintenance contract according to your plant specifications. This offers you not only a cost advantage compared with the single application maintenance measures. Also, the maintenance contract provides a maximum of comfort and safety, because we plan the necessary maintenance intervals, keep the dates in mind and ensure the smooth operation of your system.



14 | TIETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY

TIETJEN - REFERENCES

INTERNATIONALLY SUCCESSFUL.

Over 2000 Tietjen systems have already been installed worldwide.

The following references are only a small selection.



Avenal Racoos Site in Portugal:
Preparation of compounds for Petfood.
GD 20 Module with Plansifter
(Grinding concept V3)



Montego Site in South Afrika:
Preparation of compounds for Petfood.
GD 25 Module with Plansifter
(Grinding concept V1)



Mars Petcare Site in South Afrika, Brazil, Australia, China, Germany, Great Britain and the United States:
Preparation of compounds for Petfood.
(Grinding concept V3)



Josera Site in Germany:
Preparation of compounds for Petfood.
2 x GDL 20 Module with Plansifter
(Grinding concept V3)

TJETJEN - FOR THE PET FOOD AND FISH FEED INDUSTRY | 15



Havsbrun Site Faroe Islands:
 Preparation of compounds for Fishfeed.
 GD 25 Module



BioMar Site in Denmark:
 Preparation of compounds for Fishfeed.
 2 x VDK 13.1 Module with precrasher



Qeshm Site in Iran:
 Preparation of compounds for Fishmeal.
 GD 25 Module



Marine Harvest, Site in Scotland:
 Preparation of compounds for Fishfeed.
 2 x VDK, 2 x GD Module with Plansifter
 (Grinding concept V3, commissioning 2018)



Boulder A.G.

5485 Conestoga Ct. +1 720 693-3751
Suite 200 sales@boulderAGinc.com
Boulder CO 80301 www.boulderAGinc.com
AUTHORIZED SALES REP - IMPORTERS/EXPORTERS

TIETJEN
— DAS ORIGINAL —



The Grinding People

TIETJEN
— DAS ORIGINAL —

Tietjen Verfahrenstechnik GmbH
Vor der Horst 6
D-25485 Hemdingen

T: +49 (0) 4106 6333-0
F: +49 (0) 4106 81444

info@tietjen-original.com
www.tietjen-original.com