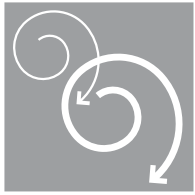


YOUR PROCESS...  
...OUR CARE



# MIXING & PROCESSING





*Mixing is more than just shuffling a few products around. Every component of the recipe has an impact on the mixing process. Dinnissen considers every mixing project unique. We combine technologies from different industry segments, based on performance tests, calculation methods and existing systems and/or processes to create a tailor-made solution for each project.*

*Dinnissen mixing systems can handle a wide range of products. We take into account the quality requirements for product mixtures (blends), homogeneity, processing time, equipment design, process capacity, cleanability according to HACCP- and GMP guidelines, durability and reliability as well as energy consumption.*

*Dinnissen mixing systems for powders, granules, flakes, liquid spraying/injection, pastes, etc. are operating successfully in various industries. We can offer you the perfect solution and the perfect solution is exactly what Dinnissen wants to offer.*

## PEGASUS® PADDLE MIXER (batch mixing)

One mixing solution is the Pegasus® Twin Shaft Paddle Mixer. You do not want your mixing step to take longer than necessary. Time is money, but the quality level must be maintained or even improved. Using a smaller mixer with a short mixing time can save you money.

The Pegasus® Paddle Mixer offers you the ability to mix almost any type of powder, granules and extruded product, completely and effectively, without exerting mechanical force on the product. The gentle handling ensures the product will not be harmed in any way. With a mixing time of just a few seconds, a homogeneous mixture can be achieved with products of varying bulk density or composition. Applying fluids to the dry components in the mixer is possible and is generally achieved with a nozzle above the fluidized zone. In this way we can achieve an optimal distribution of the liquid component within the mixture.

### Function

The Pegasus® Twin Shaft Paddle Mixer creates a fluidized zone with its specialized design and the arrangement of the mixing paddles on both shafts. In combination with a low filling ratio, a freely movable mass occurs. In this fluidized zone powders and granules will be optimally dispersed in a very short time.



### Benefits

- Shorter mixing time (3-50 seconds) than any other type of mixer
- Fast & economic because of the short mixing time
- No product damage
- Low energy consumption
- Flexible design, from gentle to high shear mixer
- Variation coefficients 0.03
- 10 PPM components without premixing
- Mixing know-how and test facilities

### Features

- Capacity of 10 to 11,000 dm<sup>3</sup>
- "Easy-to-clean" design
- Outlets with bomb bay doors for a full discharge of the batch
- Optional cutting knives for high shear applications
- Integrated feeding/weighing and conveying systems for solids and liquids
- C.I.P. cleaning possible
- Manufactured according to widely recognized standards and guidelines such as GMP/HACCP design
- Special models, designs and additional requirements are possible thanks to in-house engineering and manufacturing

*There is an answer to every question.*

*We don't think in limitations, but in possibilities.*



## PEGASUS® CONTINUOUS MIXER (in-line/continuous mixing)

With an in-line Pegasus® Continuous Mixer you can achieve high throughputs with a very small mixer. This continuous mixer ensures consistent quality in the end product in combination with a gravimetric feeding system for solids and possibly liquids.

You will find the Pegasus® Continuous Mixer in various process applications.

In some extruder applications the extruder needs to receive a constant feed of a pre-mixed or pre-conditioned product. The constant quality of this product is critical to the consistent, high quality of the end product. Dinnissen can guarantee constant high quality results.

Another application is adding expensive additives or minor ingredients. You do not want these to get "lost" or demixed somewhere in your process or conveying systems. It might be the smartest solution to add and mix the additives or minor ingredients such as enzymes, vitamins or aromas in the last step of your process, just before packaging.

You also do not want ingredients, such as fats, to contaminate your whole production line or to degrade the quality of the additives or minor

ingredients by damaging them somewhere down the line. The solution may be to add these components at the end of your process, just before packaging. Since packaging is generally a continuous process, a continuous mixer is the perfect solution.

### Function

The Pegasus® Continuous Mixer consists of a mixing vessel with double horizontal paddle shafts. An adjustable plate is fitted behind the mixing paddles to adjust the residence time to your mixing quality requirements. This plate can be operated pneumatically to empty the mixer completely at the end of your process run.

With the Pegasus® Continuous Mixer you will be able to spray liquids (oil, fat, aroma, perfume, vitamins, enzymes etc.) into your mixture at rates from 0.01 to 100 % by weight. This principle is also suitable for mixing micro-components with very short residence time to achieve a high throughput. Cooling, freezing or heating are additional process options available for the Pegasus® Continuous Mixer by injection of gases or heated air into the fluidized zones.

### Benefits

- Homogenous / reproducible mixtures
- Immediate recipe changes
- Compact system design
- Shorter mixing time than any other type of mixer

- Fast & economic because of the short mixing time
- No product damage
- Low energy consumption
- Flexible design, from gentle to high shear mixer
- Variation coefficients 0.03
- 10 PPM components without premixing
- Mixing know-how and test facilities

### Features

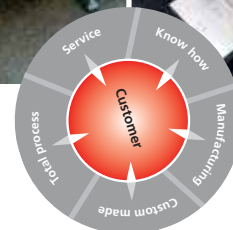
- Throughput up to 850 m³ per hour
- "Easy-to-clean" design
- Optional cutting knives for high shear applications
- Integrated feeding/weighing and conveying systems for solids and liquids
- C.I.P. cleaning possible
- GMP / HACCP design
- Special models, designs and additional requirements are possible

### Applications

Food • Animal Feed • Chemicals • Special Chemicals  
Minerals • Metal Powders • Pharmaceuticals  
Miscellaneous



*From machine to total concept,  
Dinnissen are the people to rely on.*







*Added value and improved products, this is where Dinnissen can support you. We have the perfect solution for you, whether you are adding (high value) ingredients, micro-components or coating with (low cost) oils/fat/liquids, to create or process a special product efficiently with low energy consumption.*

*Perhaps you want to do more than just enrich your product on the inside. You might want to apply some additives on the outside by flavouring or coating the particles for a number of reasons: improve the taste for the end customer, color it or make it stronger. Dinnissen can offer you experience in complete process lines with vacuum core coaters.*

*Or perhaps your product needs to be pre-treated before you can process it any further. For hygienic reasons you might need to kill all bacteria in or around specific products by heating them. You may need to preserve the shape of your product by cooling it somewhere in your process line.*

## VACUUM COATER (multiple layer coating)

The Vacuum Core Coating System with Pegasus® Paddle Mixer is very suitable for adding liquids (e.g. oils, fats or enzymes, acids, aromas, digests, gas) to extruded or pelletized feed, food or chemical bulk solids. The main feature of this system is that the liquids are absorbed into the core of the product, allowing up to 220% of liquid to be added (for example with silica products). The active ingredients (vitamins, pharmaceuticals etc.) suspended in the liquids are distributed homogeneously within the core and are well protected.

Coating takes place near the end of the process, after the product has been through the various mechanical and thermal treatments, thereby ensuring maximum quality of the active ingredients.

Vacuum core coating has been successfully applied world wide for many years by Dinnissen.

Throughputs of up to 65 tons per hour can be achieved with batch sizes varying from 30 to 4,000 dm<sup>3</sup>.

### Function

The Dinnissen Vacuum Core Coater is based on the Dinnissen Pegasus® Paddle Mixer design. The specialized design and arrangement of the mixing paddles on both shafts, in combination with a low filling ratio, creates a fluidized zone. In this zone powders and granules are

optimally distributed in a short time.

The "fluidized" particles are dynamically processed and, if necessary, sprayed with liquids from all directions. This gentle mixing action will not harm sensitive and easily breakable products in any way and does not create fines.

With the use of a pressure relief control system it is possible to get liquids into the core of the pellets or achieve surface coating by adding flavours and optimizers.

The twin shaft paddle mixer guarantees an optimal, homogeneous distribution of powders and liquids.

### Benefits

- Addition of very high or low percentages of liquids (0.01 up to 220 % by weight)
- Oils/fats inside the product
- High homogeneity, even at very small quantities of liquid addition
- Suitable for fragile products without creating fines (10 – 40 seconds mixing cycle)
- Dry surface of end product
- Increased stability of the nugget/pellet
- Controlled delivery of liquid (inside and/or outside the product)
- Maximum delivery and protection of active micro-components, no contamination
- Optimization of extruder throughput



*Dinnissen offers you one-stop-shopping  
in bulk solids applications.*

- High flowability of finished product
- Increased bulk-density of product
- Flexibility, easy recipe change
- Less environmental pollution

#### Features

- Liquid weighing/feeding system
- System for weighing and adding powdered micro-components
- Weighing systems for core components
- Complete process control
- Isolation
- Vacuum system
- Liquid injection systems

#### Applications

Pet Food • Animal Feed • Aqua Feed • Food  
Special Chemicals • Minerals • Metal Powders  
Pharmaceuticals • Miscellaneous

### THERMIDOR® (thermal treatment process)

The Thermidor® Heat Treatment Process is suitable for practically any type of heat treatment, cooling or drying process. The Dinnissen Thermidor® thermal treatment of solids (powders, granules, etc.) is also a good solution for sterilizing the product.

To avoid any cross-contamination with non-treated solids and to guarantee the necessary residence time, this is a batch process. This way a homogeneous, complete mixture after the treatment can be guaranteed.

After the thermal treatment process in the Thermidor®, various heat sensitive ingredients can be added, such as enzymes and vitamins or even pharmaceuticals.

The Dinnissen Thermidor® achieves a complete and exact mixture in combination with a thermal treatment process step.

#### Function

The products to be treated, generally a mixture of raw ingredients with hygienic processing risk, are divided into batches. Sensitive ingredients, such as vitamins, are not initially included. Through the injection of steam, the mixture is heated up to approx. 90°C in a short time. The mixture is kept in the mixer at this high temperature, controlled by a twin-temperature metering system. After the required residence time, the mixture is discharged directly into the cooling section. The fluid bed product

cooler generates very active movement of the solids, to ensure intensive contact between cooling air and solid. Once the mixture is at ambient temperature, sensitive and critical components are added in a separate mixing line. The mixture is then finished with liquid additions. For optimum mixing, a Pegasus® paddle mixer is advisable.

#### Benefits

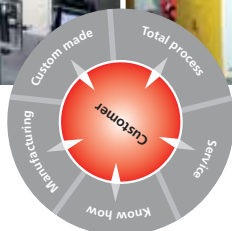
- Batch processing
- Excellent temperature consistency up to 90°C
- Controlled and guaranteed residence time
- Standby sterilizing
- Completely insulated to avoid condensation

#### Features

- Capacity of 200 kg/h to 35 tons/h
- Outlets with bomb bay doors for a full discharge of the batch

#### Applications

Pet Food • Animal Feed • Chemicals • Food



*Commitment is the foundation for  
reliable and lasting relationships.*



*Dinnissen has been in business for almost 60 years now. We consider every customer, product and process to be special. Of course some customers, products and processes have their similarities. With these similarities we gain our experience. Need high-end drying systems for pelleted or extruded particles with low energy consumption and high efficiency? Want to cut costs in your production process while processing basic, premium and super premium products? Not sure if your process might be better off with our ribbon blender than with our Pegasus® Paddle Mixer? Sometimes it is not just adjustments to current equipment and processes that are required but rather a completely new machine. We can develop, build and deliver custom solutions. Innovation is a key reason to design new or upgraded equipment together with Dinnissen. Want to see if the Dinnissen package is the right match for your product? We gladly welcome you in our D-Innocenter®. This is where your product meets Dinnissen equipment. The D-Innocenter® is a way to convince you as well as ourselves that we have the perfect solution. When we are not testing we are innovating in our D-Innocenter®. The testing in combination with our experience and references is the only way to give you the peace of mind you need when you need to install new equipment in your factory.*

## PIROUETTE® CROSS-FLOW DRYER (drying)

The Pirouette® cross-flow dryer concept is based on first-in/first-out principle. There is full separation of batches/layers and a vertical airflow, in opposite direction to the product flow.

### Function

The product lies on perforated trays. The height of the product layers is determined by the patented spreader-device, electrically driven and controlled by PLC programming. Our spreader action is unique and guarantees a regular surface over the whole bed, creating a uniform depth of product with no 'dead zones' in the trays. The first deck works as a 'flash off', then discharges the product to the next deck and the procedure is repeated. Air temperature and air humidity are controlled and monitored by accurate instruments. This ensures a very gentle and even drying process. The flow of the drying air is mainly controlled by patented design of the trays, which makes it less dependent on the height of the product layers. Having multiple decks makes it possible to create adapted atmospheres, according the state of the product (temperature, humidity). Contamination free, multi-deck extraction. It is a controlled drying process with minimal variation in moisture content.

### Benefits

- Unique patented spreader system
- Homogeneous product layers, without mechanical action
- Multi-deck design, suitable for various temperature zones
- Contamination free, fast recipe change
- Design according to HACCP and GMP
- Low energy consumption, high efficiency
- Suitable for pellets from 1-28 mm

### Features

- Capacity 200 kg/h to 35 tons/h
- Compact design (vertical type)

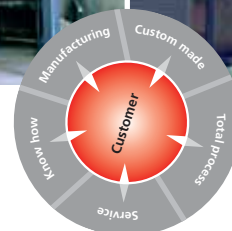
### Applications

Pet Food • Animal Feed • Aqua Feed • Food  
Special Chemicals



*Solutions...*

*...for every sector.*





## RIBBON MIXERS (specials)

The single or double shafted horizontal ribbon mixer is used for intensive and efficient mixing of homogenous solids (powders and granules) and pastes (low viscosity masses).

### Features

- Mixing time is 2 to 5 min, depending on the product
- Batch capacity is up to 50 m<sup>3</sup>
- Discharge occurs via slide valves or a bomb bay door system
- Maintenance friendly
- Suitable for liquid spraying / injection system

## LAB-EQUIPMENT FOR PROCESSING

Pegasus® Lab-mixer/coater offers, due to excellent and fast mixing performance, a universal solution for all your mixing needs in the research department. The characteristics of the Pegasus® Lab-mixer – such as mixing speed, homogeneity, minimum product damage and suitability for products of varying bulk density and form – guarantee an excellent mixing result. With its simple filling method, complete discharge, good accessibility and ease of cleaning the Pegasus® Lab-mixer is suitable for use in many industries. It is a compact, mobile unit.

### Features

- Atmospheric/vacuum processing is achieved through a pressure-resistant housing and built-in vacuum section
- Features include liquid injection, from 0.01 - 40%, integrated PLC-control and speed control by frequency converter
- Removable mixing trough and exchangeable mixing tools for different products make it very flexible
- In addition, other small scale laboratory units for drying, milling and heat treatment of bulk solids are available to suit your needs

## TESTING FACILITIES

With our own D-Innocenter® we have a testing facility that offers ample possibilities for developing new products or testing your products with our equipment.

Dinnissen has specialized know-how in the engineering and production of machines for feed and food, such as mixers, sifters, bag emptying equipment, feeding equipment for micro-components, enzyme-addition systems, recycling plants etc.

Considering our wide experience and know-how in the field of powder technology, we can supply total concepts and solutions as a complete system, with an eye for detail. Automated feeding (volumetric or gravimetric), weighing and discharge/conveying systems can be integrated. For new products we can offer extensive mixing tests in our own testing facility, D-Innocenter®.

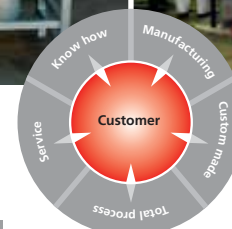
In our D-Innocenter® we can offer you the following testing facilities:

- Product Intake Systems
- Pneumatic Conveying Systems
- Feeding & Weighing, gravimetrically and volumetrically
- Mixing & Processing
- Milling & Grinding
- Sifting
- Packaging (bags, big-bags, tote bins)

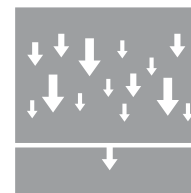
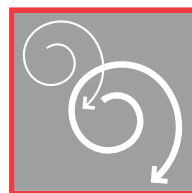
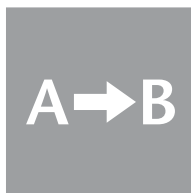
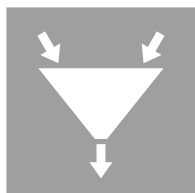


*Challenge...*

*...the natural innovators!*



# YOUR PROCESS... ...OUR CARE



PRODUCT INTAKE

PET FOOD

FOOD

RECYCLING

CONVEYING & HANDLING

AQUA FEED

LIFE SCIENCE

MINERALS

FEEDING & WEIGHING

FEED

PHARMACEUTICAL

DETERGENTS

MIXING & PROCESSING

CHEMICAL

PLASTICS

MILLING & GRINDING

SIFTING

PACKAGING

