



## Continuous Manufacturing of Oral Solid Dosages by Gericke ...

**Gericke**

Powder Processing Equipment and Systems



# Continuous Manufacturing of Oral Solid Dosages ...

## Approved systems for a reliable production

The most important challenge for the pharmaceutical industry is to take the QbD concept and look at its manufacturing processes in 'lean' terms to start to adapt for a more efficient future.

Gericke continuous mixing process technologies are ideally suited to the new era of efficient solid dose pharmaceutical manufacturing. Systems are fully developed and have been proven in the market.

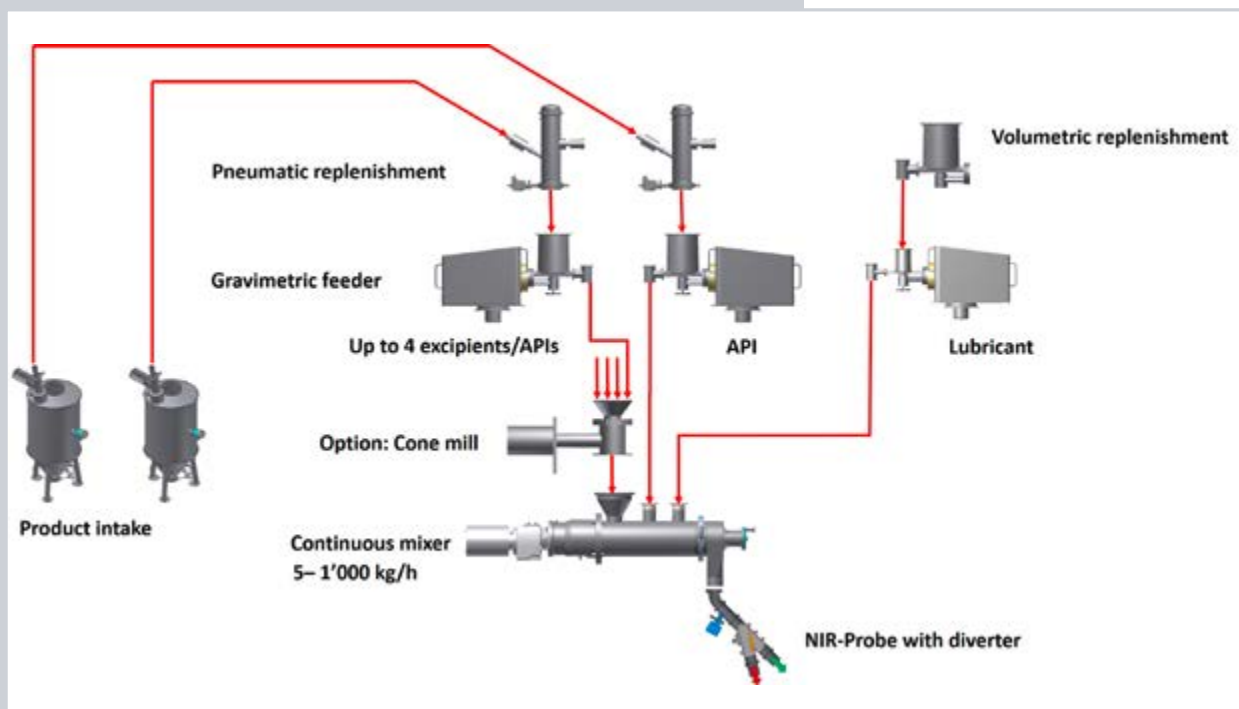
**Our Continuous Manufacturing Modules combine high precision loss in weight feeders with scientific designed compact mixer and integrated PAT solutions.**



<b>General: Strengths of continuous processing in the context of mixing solids</b>	<b>Relevance for pharmaceutical solids production</b>
Easy to integrate into an existing continuous process.	Compression, extrusion and roller compacting become continuous processes
Continuous mixing system takes up less space thanks to the compact dimensions of the equipment.	Amount of space required by a feeding/mixing module for 4-6 components is 2*2*2 metres
Less risk of demixing, as the process volume is smaller and there is no need to empty large-volume batch mixers or intermediate tanks. Much less material is stored temporarily.	Continuous mixer with a volume of 1-10 litres. Production time required to turn the raw material into a tablet = 5 minutes –“process intensification“.
	Shorter development time, as the same feeding/mixing module is used for the initial test product as for the subsequent marketable product. To increase the „batch size“, you extend the production time.
The fully automated process cuts operating costs. The manufacturing process and the product quality are assured by means of sophisticated measurement and control technology.	The continuous feeding and weighing technology represents an integrated P(rocess) A(nalytical) T(echnology) solution that can ensure a formulation accuracy of 0.1 -0.5% thanks to its high-resolution timing and weighing.
Improved product quality –the highly homogeneous shear rate and limited residence time distribution mean that the product is subject to very even levels of stress.	Very gentle processing of sensitive products thanks to low speeds and minimal drop heights as well as short mixing times of less than 30 seconds
	Less waste



# Gericke Continuous Feeding Mixing Module ...



## Process Control and Critical Quality Attributes (CQA)

- Continuous measuring and control of flow rates of API and Excipients
- Continuous measuring of mixer content and mean mixing time
- Blend homogeneity e.g. by on line NIR spectroscopy

## GMP Design

Gericke feeders and mixers are designed for quick and easy cleaning. All parts with product contact can be removed in short time for cleaning by a single operator. Material and FDA certificates available.

## System integration

Integration of upstream equipment for refilling loss in weight feeders including raw material handling.

## Automation and Controls

- Siemens or Allen Bradley
- PLC and SCADA systems according to 21 CFR part 11
- GAMP5 Validation
- Integration into customers MES/ERP System
- Qualification and Validation documents: (IQ/OQ, FAT, SAT)
- Onsite support from one of our 10 global subsidiaries

## Gericke Continuous Feeding-

**Mixing-Modules** supply mixtures from 5 to 1000 kg/h for:

- Direct compression of API and up to 5 excipients
- Dry and Wet Granulation
- Hot Melt Extrusion
- Sachet and Capsule Filling



## Feeding ...

### Feeding rate

GZD100.12	0.05 kg/h	–	2.5 kg/h
GZD200.12	0.5 kg/h	–	25 kg/h
GZD200.22	5 kg/h	–	100 kg/h
GZD300.32	20 kg/h	–	200 kg/h

The completely new gravimetric twin screw feeder for applications in pharmaceutical and food industry suits all needs for continuous and batch production. Even cohesive products are dosed accurately and reliably. The feeder can be delivered as single machine or as part of a fully integrated continuous dosing and mixing station for multiple components formulas.

### Advantages

- High feeding accuracy and feeding constancy (usually below +/- 0.5%)
- Encapsulated drive and weighing unit
- Removable feeding unit for fast and hygienic cleaning
- Rotatable mounting for optimal accessibility at the plant
- Negative conical bin for optimised product flow
- Modular design – Components can be exchanged easily to adapt the feed rate
- Usable for WIP
- Can be used both for batch and continuous gravimetric feeding



### EasyDos Pro

Gericke feeders are controlled by a unique weighing algorithm, TrendTec. TrendTec is based on 50 years of experience with continuous loss in weight feeders. It works with pre-registered feeder rate and hopper profiles, allowing to forecast feed rates and compensation of bulk density variations even during refilling of feeders.

## Mixing ...

The infeed ingredients are continuously weighed by the Gericke metering system and fed into the mixing chamber in accordance with the recipe. Gericke continuous Mixers GCM offer the optimum combination of radial and axial mixing (dispersion) depending on the task and the type of component. The shape, layout and adjustment of the Gericke mixing tools has been developed and specified by many tests and in collaboration with universities. The Gericke Continuous Mixer is designed as a continuous mixer with modular components. The residence time and the energy input can be varied

### Advantages

- Maximal mixing homogeneity even with very small component proportions
- Continuous measuring and evaluation of mean mixing time
- Easy adjustment of mixer to vary products, recipes and capacities
- Minimal product residue at the end of the process, good residue discharge
- Low space requirements even with large throughputs
- Removable mixing tool and housing for fast and hygienic cleaning

### Capacities

GCM 250:	5	–	2.5 kg/h
GCM 450:	5	–	500 kg/h
GCM 800 ECD:	100	–	1000 kg/h



# Testing the Gericke Feeding Mixing Modules ...

A wide range of applications are suitable for this advanced and efficient technology combination. The overall efficiency gains in process and true cost of ownership compared to other technologies offer an interesting opportunity to reduce the cost per tablet, improve tablet quality and substantially improve the pharmaceutical manufacturing efficiency.

Gericke's Test Centre in Switzerland, is available to our clients for product trials using their own materials. The test centre is equipped with full-scale test equipment for continuous mixing and feeding trials.

## Why we recommend carrying out trials at our Test Centre ...

- Machine selection and settings can be confirmed
- Process-related information obtained
- Identification of process limitations
- Comparison of various design alternatives
- Profitability assessment
- Tests ensure secure investment
- Individual support and consulting service with the help of experienced Gericke experts
- Transfer of expertise

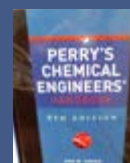
## The result

- Risks minimised as key components can be tested and maximum capacities established
- Shorter engineering phase as process options can be simulated with Gericke's extensive range of systems
- Acceleration of innovations projects

## Scientific books about mixing of solids with participation by Gericke:



1995



2008

Chapter 21 Solids  
Mixing written by  
Dr. Ralf Weinekötter



2000



2016

Chapter 9 Mixing of  
Solid Materials solids  
by Dr. Ralf Weinekötter





# Gericke offers complete solutions for a wide range of powders ...

## **Gericke Feeding and Mixing Technologies**

When space is at a premium, Gericke continuous mixing systems offer the ideal solution. Gericke also provide full recipe management programmes incorporating feeding and flow control for maximum mixing consistency. When the process involves multiple components and frequent product changes, Gericke batch mixing stations are used.

## **About Gericke**

Gericke supplies conveying, sifting, high-precision feeding and mixing solutions that handle a broad range of ingredients such as pellets, powders, floodable powders and fibreglass for food, chemical, industrial, and pharmaceutical industries.

Gericke was founded in 1894 and is managed by Markus Gericke in the 4th generation.

## **Switzerland ...**

Gericke AG  
Althardstrasse 120  
CH-8105 Regensdorf  
T +41 44 871 36 36  
gericke.ch@gericke.net

## **Germany ...**

Gericke GmbH  
Max-Eyth-Strasse 1  
DE-78239 Rielasingen  
T +49 77 31 929 0  
gericke.de@gericke.net

## **United Kingdom ...**

Gericke Ltd.  
Victoria House  
Cavendish Street  
GB-Ashton-under-Lyne  
Lancashire OL6 7DJ  
T +44 16 13 44 11 40  
gericke.uk@gericke.net

Rota Val Ltd.  
Bumpers Way  
Bumpers Farm Industrial Estate  
GB-Chippenham, Wiltshire, England SN14 6LH  
T +44 12 49 65 11 38  
sales@rotaval.co.uk  
www.rotaval.co.uk

## **France ...**

Gericke SAS  
7, rue Guy Moquet  
FR-95100 Argenteuil  
T +33 1 39 98 29 29  
gericke.fr@gericke.net

## **The Netherlands ...**

Gericke B.V.  
Zuiderinslag 18  
NL-3871 MR Hoevelaken  
T +31 33 25 42 100  
gericke.nl@gericke.net

## **USA ...**

Gericke USA, Inc.  
14 Worlds Fair Drive,  
Suite C in Somerset,  
NJ 08873-1365  
T +1 855 888 0088  
gericke.us@gericke.net

## **Brazil ...**

Gericke Brasil Ltda.  
Rua Andaraí, 662  
CEP 09050-000, Vila Floresta  
BR-Santo André, SP  
T +55 11 2598 2669  
gericke.br@gericke.net

## **Singapore ...**

Gericke Pte Ltd.  
434 Tagore Industrial Avenue  
SG-787812 Singapore  
T +65 64 52 81 33  
gericke.sg@gericke.net

## **China ...**

Gericke (Shanghai) Pte Ltd.  
Room 103, No.7 Building  
59 Shennan Road  
CN-Shanghai 201108, P. R. China  
T +86 21 5382 0108  
gericke.cn@gericke.net

## **Indonesia ...**

Gericke Indonesia (Rep. Office)  
Ruko Prominance Alam Sutera, Blok 38 - H No. 28  
Serpong – Tangerang 15325  
T +62 21 2958 6753  
gericke.id@gericke.net

**gericke.net**

**Gericke**

**Powder Processing Equipment and Systems**