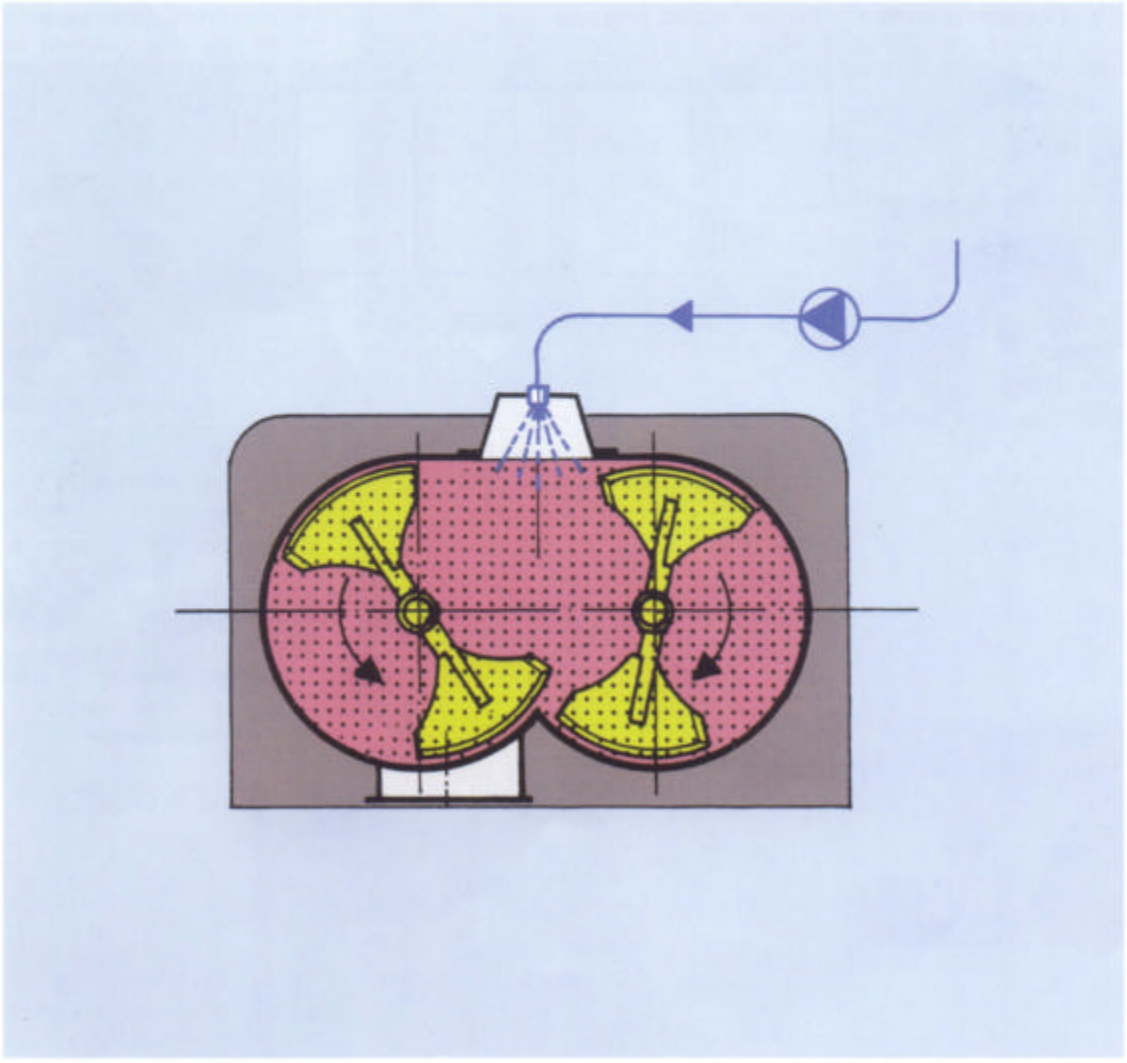
Gericke

Powder Processing Equipment & Systems

Excellent Mixing Quality with the Gericke Multi-Flux Mixer



Leaflet No 614e replacing 564e

Cat. Index 5

The Right Mixing System

We prepare comparative solutions for batch and continuous mixing systems. You may then select the most appropriate system for your process.

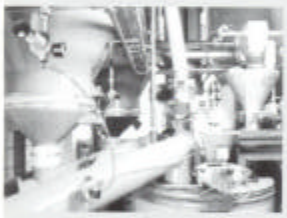
This brochure describes a mixer suitable for batch processes. For continuous processing ask for our brochure on 'Continuous Mixing'.

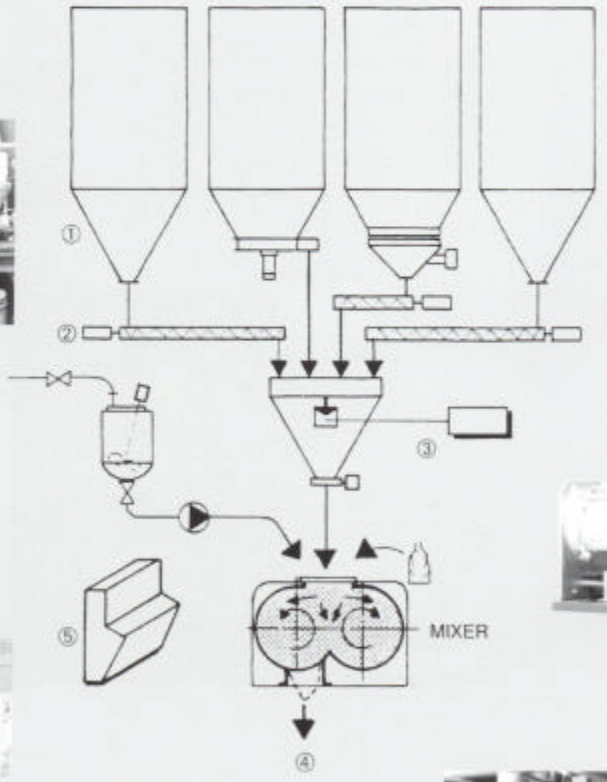
For a batch mixing process the following operations must be optimised and harmonised:

1. Storage and discharge of ingredients.
2. Feeding of ingredients.
3. Weighing of ingredients with the mixer acting as a weighing vessel or in a weigh-hopper above the mixer.
4. Further handling of the finished mix such as onward conveying (without segregation), intermediate storage, feeding into reaction vessels, packaging or other processes.
5. Control of process sequence including preset formulation for ingredients, quality control, registration, recording, etc...

Our experience in the planning and supply of numerous mixing plants enables us to submit proposals for any or all of the above project stages.

If you already operate a mixing plant we will evaluate with you rationalisation and improvement of processed product quality.





Criteria for selecting a mixer

Properties of Ingredients

These include bulk density, particle size, flowability, moisture content, compressibility, fluidisation, sensitivity to mechanical stress, heat influence, tendency to corrosion and abrasion.

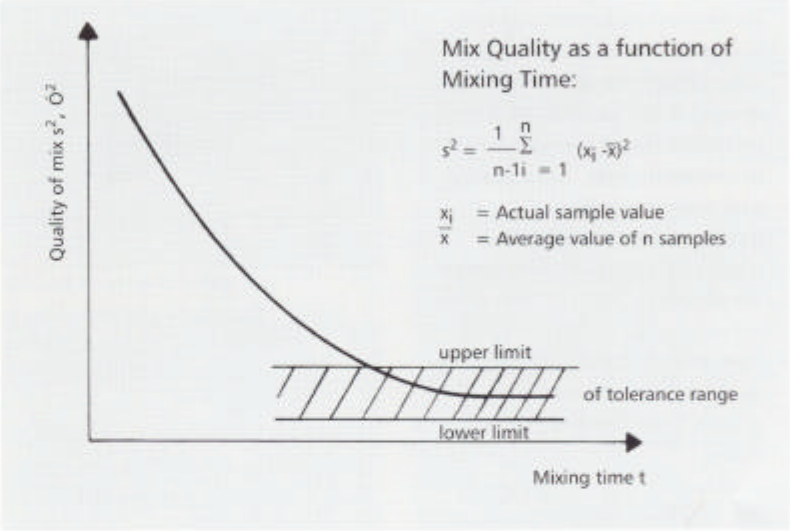
The Recipe

States the number and quantity of ingredients. The source of these (in bags, drums, containers, big bags, tankers, silos, etc) is important.

Other process technical operations have to be considered such as addition of liquids, crushing of agglomerates and lumps.

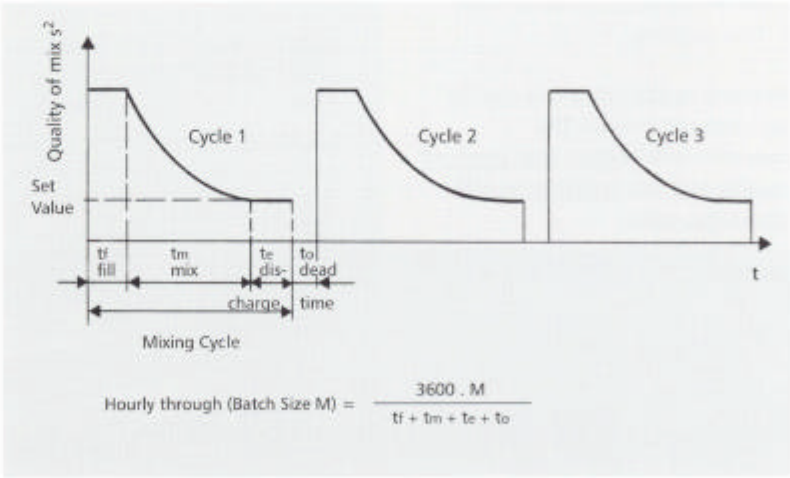
The Quality of Mix

The quality of mix is determined by the distribution of the different ingredient concentrations and is a measure of the quality of the end product. It is defined by the variance o with respect to the empirical standard deviation s, dependent on the number n of samples, their size and the sampling method.



Mixer Size as a Function of Mixing Capacity and Cycle Time

The mixer size depends on the amount of material required to be mixed per hour or shift and on the mixing cycle time.



Optimisation of the Mixing Process

Depending on the mixing process, the following have to be optimised: power consumption, creating or avoiding shear forces, heat transfer, mixing time, mixer size, feeding and discharging.

The Concept of the GERICKE Multi-Flux Mixer

The design and operation of this mixer have been developed to meet the following requirements:

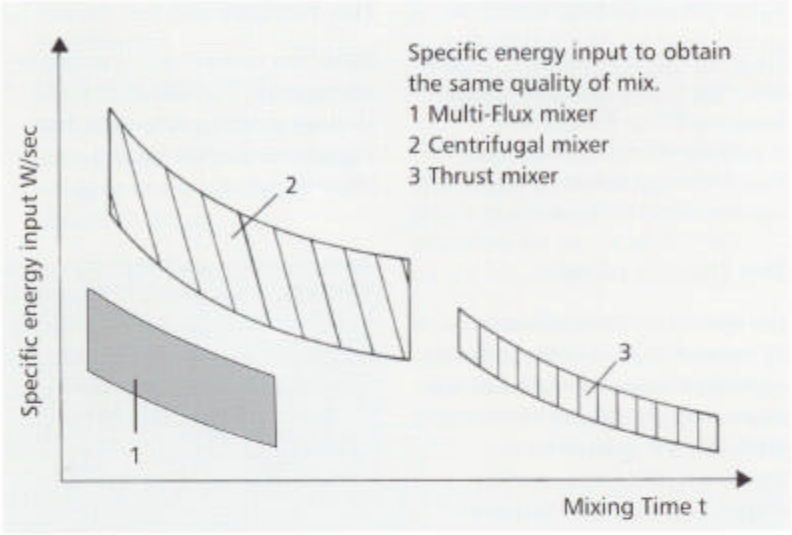
- **Very Gentle Mixing**
  As little product abrasion as possible and no reduction of particle size.

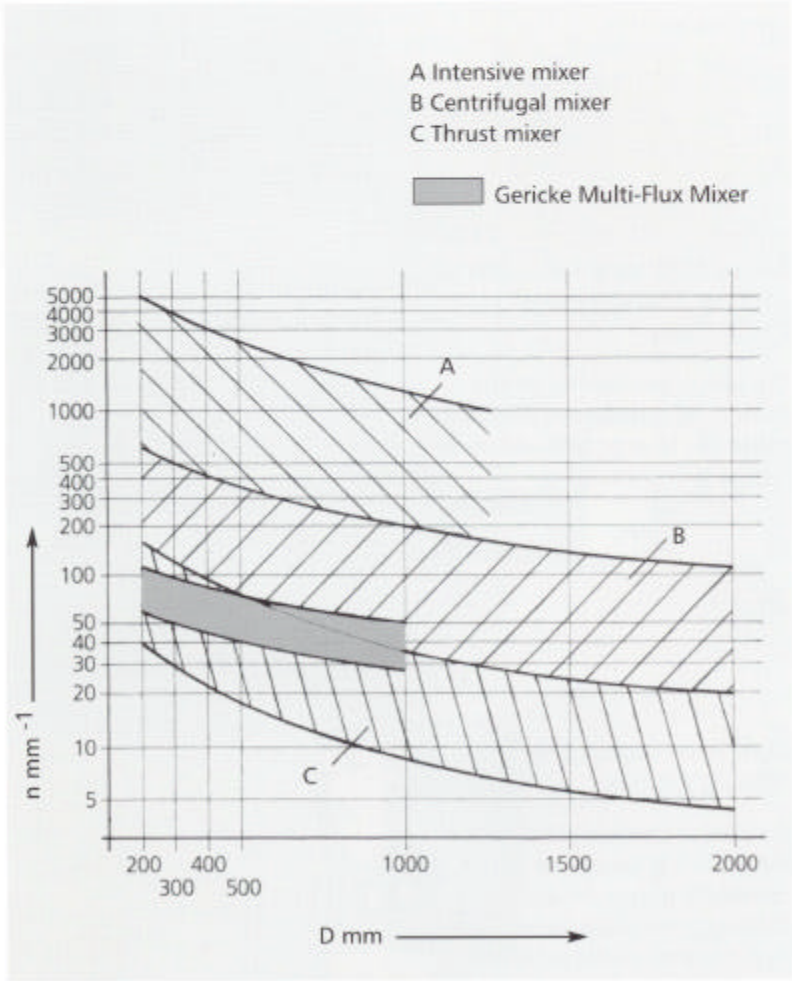
- **Extremely short mixing time**
  Coupled with short discharge time allows the use of a smaller mixer for the same output with less space requirements, lower investment costs, less cleaning and maintenance.
  In most cases the expected quality of mix is reached within 30 seconds.

- **Low power consumption**
  Avoidance of undesirable product heating thus saving energy.

  The GERICKE mixer requires very little additional motive power when loaded than when load free running.

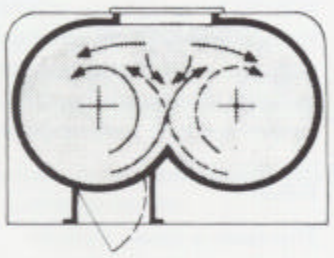
In many applications this mixing concept will achieve the requirements of improved product quality and low investment and operating costs.

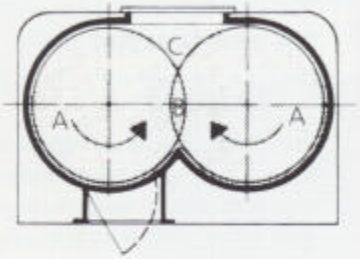




More Gentle and Rapid Mixing, less Waste of Energy

Mixing principle of the
Gericke Multi-Flux Mixer





A Thrusting zone.
B Division of the streams in the area where the rotors mesh.
C Fluid zone. Intermixing of streams. Addition of liquids.

To achieve a more gentle mixing process we have avoided a whirlpool action at a high Froude number (eg $3 < Fr < 10$). On the other hand a short mixing time cannot be achieved if the mixer works with a Froude number < 1.

The GERICKE Multi-Flux Mixer has therefore been designed with its mixing action slightly above Froude number 1 ie just enough to make the product float. $1<Fr<2$.

The double rotor system produces different product streams which are continuously intermingled with each other (as when shuffling playing cards).

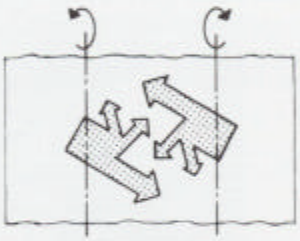
Optimal distribution of ingredient concentrations in the mixture depends on the action of the mixing blades developed by GERICKE and on the meshing arrangement of the rotors. The meshing of both product streams in the floating zone and the different distribution of the two streams produces not only a commixture (longitudinal mixing over longer distances) but also an intensive fine product distribution. Energy consumption thus remains minimal.

[1] The Froude number $Fr = \frac{R \cdot w^2}{g}$

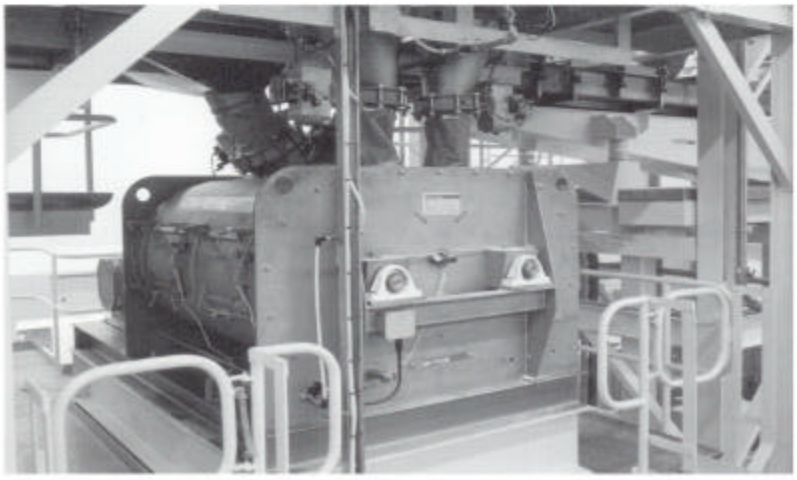
Serves to characterise the displacement of products in the mixer through the ratio of centrifugal force to gravity.

It indicates whether and to what extent the GERICKE mixing blades throw the product or make it float.

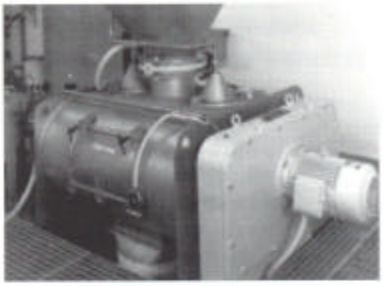
At $Fr<1$ (called thrust or blade mixing) mixing is achieved by displacement and folding of the product. At high Froude number (eg $Fr>2$), particles are whirled up with higher energy consumption and mechanical strain (abrasion, attrition) on them.



Distribution of product streams from one blade in zone B

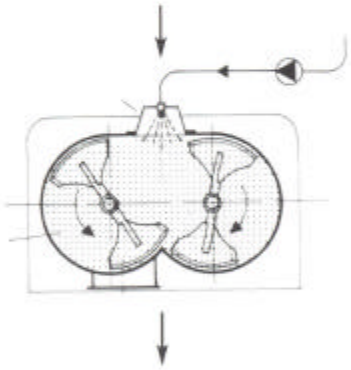


The Mixer Design - A result of GERI in meeting the requirements of the



Liquid Addition

One or more nozzles spray the liquid into the fluid product zone. Experience shows that there is less tendency for agglomerates to form than with other mixing systems, so in many cases the de-agglomerator is unnecessary.



De-agglomerator

Disintegration of lumps and agglomerates is effected by one or more mounted de-agglomerators. They are so designed and arranged that any lumps are quickly disintegrated with minimum energy input.

Mixing Chamber

The design of the mixer body allows the blades, built onto the rotors, to work with close tolerance to the chamber walls, thus eliminating dead spots.

Discharge Door

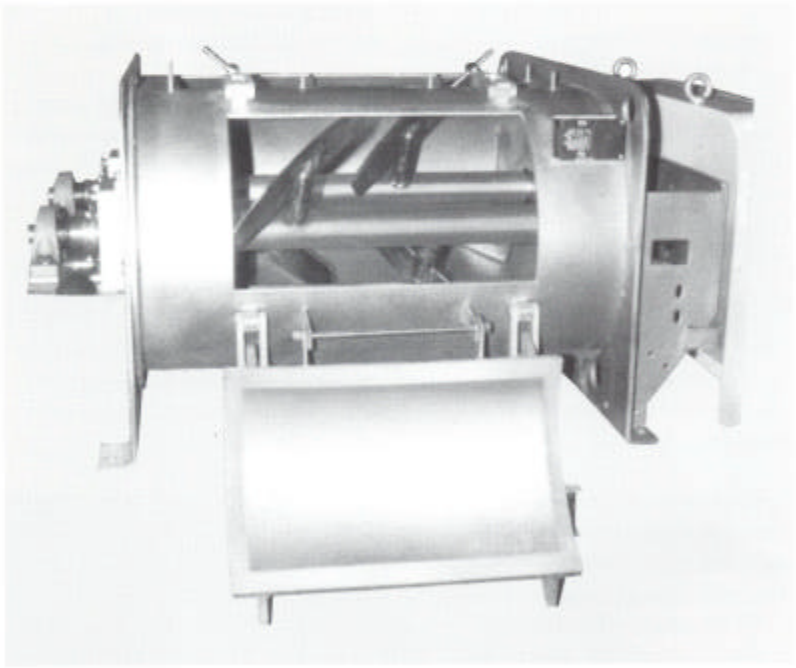
The discharge door is tight sealed by means of special sealing and a toggle clamp. It remains closed even when control air pressure drops.

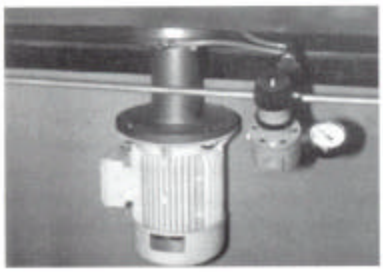
Shaft Sealing and Bearings

The designs used for these are well proven in even the most arduous conditions and are suitable for use in sanitary applications. All seal types; labyrinth gland, air or gas purging, stuffing box, removable sanitary packing; can be used in conjunction with outboard bearings.

Drive

The mixer is driven through directly coupled solid toothed gearing (no chain transmission). This gearing also synchronises the rotation of the two rotors.





Cleaning of the Mixer

The large cleaning doors allow thorough wet or dry cleaning of the mixing chamber. The mixer can also be supplied with a built-in nozzle for cleaning in place.

Discharge

Quick discharge without segregation and minimal product retention are primary advantages of this mixer.

CKE's immense design experience food and chemical industries.

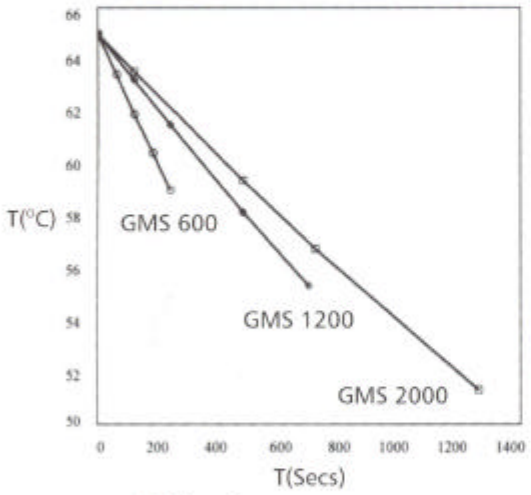
Process Mixer

High quality mixing often determines the efficiency and yield of the following process:
- Heat transfer - heating and cooling
- Coating
- Agglomeration/Granulation
- Reaction processes
- Addition of liquid active agents or flavourings.

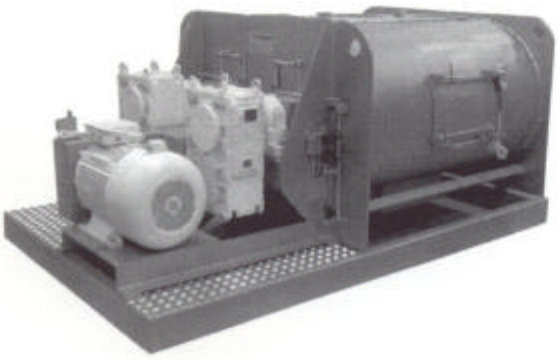
The mixer can be supplied with jackets for heating and cooling processes

Cooling graph for intermediate chemical products:

Machine type: GMS Multi-Flux Mixer
T = Product outlet temperature



t = Mixing time



Multi-Flux Mixer range from GMS 150 - 5000

Test and Loan Mixers

Test and loan mixers are available to allow you to test the mixing of your ingredients on an industrial scale. They are also available for testing liquid injection and for use with a de-agglomerator.

TYP	Capacity Litre	Useful Volume Litre	Filling Volume Litre
GMS 150	150	120	40 - 120
GMS 300	300	240	75 - 240
GMS 600	600	480	150 -480
GMS1200	1200	960	300 -960
GMS 2000	2000	1600	500 - 1600
GMS 3000	3000	2400	750 - 2400
GMS 5000	5000	4000	1250 - 4000

Prove it yourself!

Since it was established in 1894, GERICKE has specialised in the mixing of bulk solids. With ever more demanding customer requirements, improved materials and continuous research and development, we have created new advanced designs for both batch and continuous mixing.

Before buying any mixer it is worth carrying out mixing trials on a GERICKE Multi-Flux Mixer, either in our test laboratory or with a rental unit , even if you already have other mixers running.

You can take this opportunity to test feeding and pneumatic or mechanical conveying equipment for charging the mixer or conveying the finished product.

You may well be surprised that it is possible to mix your product more quickly and yet gently, and even with less energy input.

You must also observe how easy it is to clean and maintain this mixer.

Multi-Flux Mixer GMS 3000 with Carton filling station for coating powders

ISOQAR QUALITY ASSURED FIRM

Certificate No.906/95

Typical Applications

- Milk Powder
- Coffee
- Iced tea
- Museli
- Spices
- Dessert powders
- Chemicals
- Fertilisers
- Plant-protective agents
- Plastics
- Coating powders
- Detergents
- Pharmaceuticals

Gericke

Powder Processing Equipment & Systems

Gericke Limited Victoria House, Cavendish Street, Ashton-under-Lyne, Lancashire OL6 7DJ.
Telephone: 0161-344 1140. Fax: 0161-308 3403.
www.gericke.co.uk

Gericke Pte Limited 436 Tagore Avenue, Singapore 2678.
Telephone: 0065 4528133. Fax: 0065 4520392.

CH-8105 Regensdorf
NL-3870 Hoevelaken
D-78239 Rielasingen
F-95100 Argenteuil