

Pulp Feeding on Biogas Appliances

Flexible and Cost-Efficient with the NEMO® B.Max® Mixing Pump



Functionality of Pulp Feeding Using a NEMO® B.Max® Mixing Pump



The substrates such as dry chicken faeces, whole plants, grass or corn silage as well as coferments with recirculates (liquid manure and the like) from the fermenter or post-fermenter are added to the mixing pump in various compounds via a solids dispenser.

Via a feeding tube on the funnel of the mixing pump the liquid manure or the recirculate is added using a displacement pump.

The dry substrates are also added to the funnel via a solids dispenser.

The liquid phase and the dry substrate are already mixed in the funnel area.

With the help of a feeding screw conveyor in the pump housing the mixture flows into the tamping area. The progression of the screw means that more liquid phase is transported to the rotor-stator system than the pump may transport on from the tamping area. The remaining liquid area is subjected to a back flow, which is reinforced due to the segmented screw elements. Thus, the homogenisation of the both substrates is achieved and a pumpable medium (pulp) is created.

The NEMO® B.Max® pumps this substrate to one or several fermenters. The biogas appliance may thus also be fed via long pipe systems on different levels.

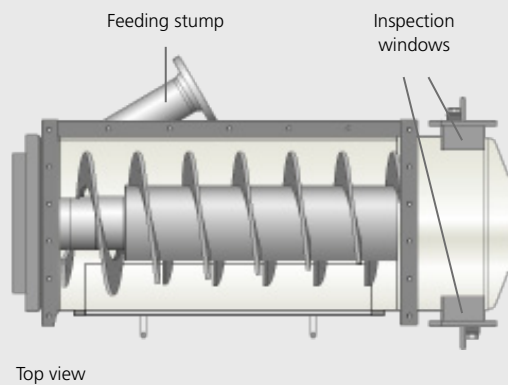
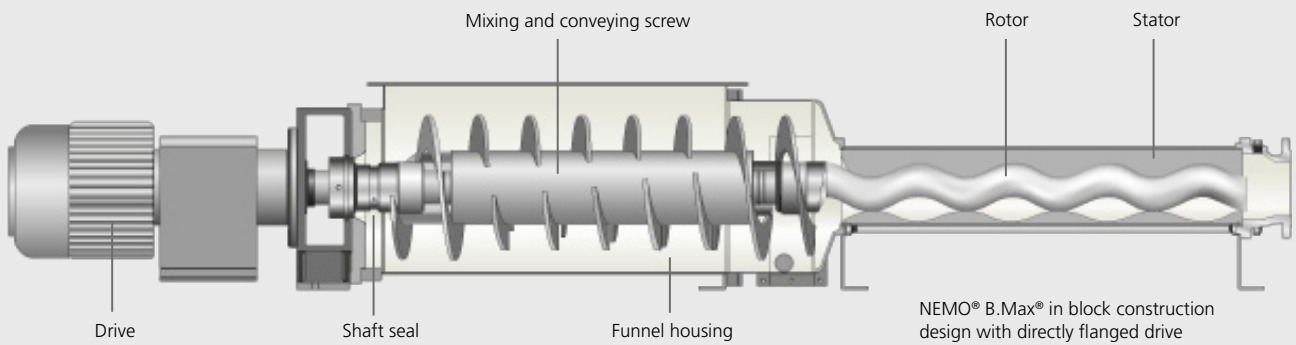


Corn



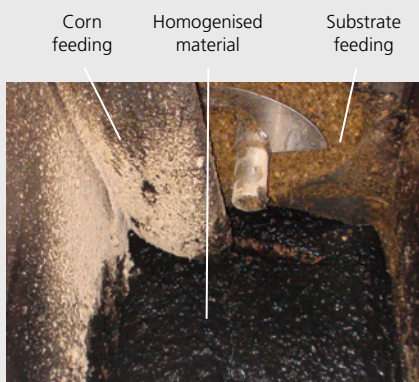
Dry chicken faeces

New Standards due to Maximum Mixing and Transport of Biosubstrates



NEMO® B.Max® is Particularly Suitable for the Following Materials:

- Fermented, renewable raw materials
- Hackled bio waste and scraps of food
- Co-substrates
- Whole plant silage
- Corn silage
- Grass silage
- Manure
- Dry chicken faeces
- Liquid manure



View inside the funnel of NEMO® B.Max®

Advantages

- Discharge quantities to 70 m³/h
- Pressures to 48 bar
- Continuous and low-pulsation flow irrespective of pressure and viscosity
- Long lifetime due to low levels of wear and tear

Saving with the NEMO® B.Max® Mixing Pump

SAVE TWICE DUE TO

- the reduction of the stirring time and
- the reduction of the substrate use

In this example (Biogas appliance of 340 kW) NEMO® B.Max® replaces a dry

feeding system consisting of a chain conveyor and conveyor belts.

Reduction of stirring time by more than 50 %

	Old installation	New installation	Improvement Savings
Time per day per stirrer	8 hours	2 hours	6 hours
Energy required per day for two fermenters with two stirrers each, thus a total of 44 kW/h	352 kW	88 kW	264 kW
Costs* per kWh	0.15 €	0.15 €	0.15 €
Electricity costs for two existing fermenters per year	128 480 kW × 0.15 € = 19 272 €	32 120 kW × 0.15 € = 4 818 €	14 454 €

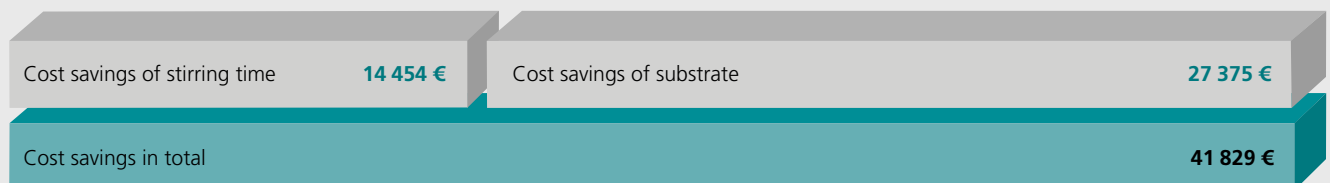


Reduction of the substrate use by approx. 15 %

	Old installation	New installation	Improvement Savings
Substrate quantity required per day	22 t	19 t	3 t
Substrate costs* per t	25 €	25 €	25 €
Substrate costs per year	$22 \text{ t} \times 365 \text{ days} \times 25 \text{ €} = 200\,750 \text{ €}$	$19 \text{ t} \times 365 \text{ days} \times 25 \text{ €} = 173\,375 \text{ €}$	27 375 €

In this example the electricity consumption of the new system with the NEMO® B.Max® mixing pump is identically equal to the old feeding system.

Savings per Year



By saving electricity and substrate with the help of using a NEMO® B.Max® mixing pump instead of a solids feeding

system with the biogas appliance of a performance of 340 kW **more than 40 000 € per year may be saved.**

Advantages of Pulp Feeding

CHOOSE FOR YOURSELF!

Higher returns or
lower substrate use?

Higher Returns With the Same Use of Substrate

Increased Gas Production

- due to more stable fermenter biology
- due to the faster development of the substrates, as with the help of recirculates the substrate is pulped and inoculated with active bacteria directly in the pump
- due to the recirculation of fermenting substrate

Electricity Savings

- due to shorter operating times of the stirrers. This is achieved by increasing the own convection in the fermenter, due to which the buoyant layer development is reduced
- due to the level temperature of the substrate in the fermenter. In particular, in the case of lower temperatures of the original substrate the increased surface of the substrate facilitates the temperature increase
- due to the avoidance of the pulping pit and thus the lower energy consumption for mixing and transporting

Low Investment and Maintenance Costs

- due to protecting the pump for the transport of the liquid manure from the collection container to the biogas appliance
- due to the lower volume requirement of the fermenter
- due to higher lifetimes thanks to robust, well-engineered components that are adjusted to the application
- due to the flexible feeding of several fermenters, e.g. main fermenter and post-fermenter
- due to the avoidance of expensive wear and tear parts such as conveyor belts, chain conveyors etc.
- due to flexible and simple upgrades
- due to the adjustment of the fitting dimensions of the mixing pump to the requirements of the appliance
- due to the integration of the existing dosing technology to the pulp feeding system thanks to the random location choice. Due to its high pressure capacities the use of the progressing cavity pump technology allows for pressures of up to 48 bar to be overcome. Thus, the mixing pump may be located directly at the mobile silos at longer distances from the biogas appliance. The mixing and transporting pump are connected with one another via a piping loop

Lower Substrate Use for Same Gas Yields

In Appliance Examples the Substrate Savings are Approx. 15%.

Lower Emission Levels

- of noise and odours due to lower clock pulses/transport motions of the substrate to the feeding
- due to a closed pipe and pump system. Odours, dust and noise are retained
- at the same time increase the scope for new projects, as not few biogas appliances today already achieve or even exceed the maximum levels allowed

Less Space Needed

- due to lower uses of substrates allows for other uses or the conservation of existing farm areas
- for the storage and supply stocks of substrates with the mobile silos



Whether it be the optimisation of an existing appliance or a new facility, pulp feeding with the NEMO® B.Max® pump is the feeding system of the future.

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The NETZSCH Business Unit Pumps & Systems offers NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, screw pumps, macerators/grinders, dosing systems and equipment custom built and challenging solutions for different applications on a global base.

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