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EPSILON Inline Disperser

Trial Guide for NETZSCH *EPSILON* 30

EPSILON Inline Disperser Trial Guide

To ensure that trials carried out in the NETZSCH-Feinmahltechnik laboratory run smoothly and successfully from the planning stage through the evaluation, we are providing you with the *EPSILON* Trial Guide, which includes all the key information in a concise form. It is important to know that the *EPSILON* wetting process and the method of operating the machine differ from conventional dispersion processes and machines. For this reason, the procedure for manufacturing a product can also differ from the conventional process. With the *EPSILON* Trial Guide, you will know from the very start of your test planning what is needed to conduct a successful trial.



EPSILON System Laboratory Equipment | NETZSCH-Feinmahltechnik Selb

Machine

- *EPSILON 30*
- Pneumatic diaphragm pump
- Tank for liquid supply or product
- Coolable
- 200 liter effective volume
- 250 liter total volume
- Pitched-blade agitator attachment
- Powder feed
- Cooling/heating unit for product tempering over the cooling surface of the tank

Batch Preparation Aids

- Balance accuracy 0.5 kg (pallet lifter)
- Balance up to approx. 30 kg, accuracy 1 g for small quantities
- Barrel lift to empty barrels
- Fork lift
- Pallet truck
- Sack chute
- Suction lance for lightweight powder, such as Aerosil for example

Product Evaluation

- Grindometer 15 μm , 25 μm , 50 μm , 100 μm , 250 μm
- Malvern Mastersizer 3000 for particle size measurement
- Malvern Kinexus for viscosity measurement
- Incident light and scanning electron microscope



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Functionality and Operation

The *EPSILON* inline disperser employs various dispersing effects, without the use of classic rotor-stator systems. Basically, the fluid flow in the process housing should create the largest possible liquid surface, into which the powder is drawn. Then pressure differences, shearing and cavitation act on the product to achieve the desired quality. The machine processes products with low to moderate viscosity without additional pumps. Here, a sufficient quantity of the liquid or the product must flow into the machine at all times. This usually

occurs up to a viscosity of approx. 5,000 mPa. At higher viscosities, a feed pump is required. In order to prevent loss of flow, the system is designed such that the product feed and return line is as short and direct as possible. The circulation tank has a conical bottom with a centric outlet and is built so that there is a sufficient suction head. The powder feed is usually via a sack feed station or, for very light-weight powders such as fumed silica, via suction lance. The powder feed must be as direct and short as possible.



Test Preparation | Customer

- If possible, all dry and liquid components should be delivered pre-weighed and in individual containers. This simplifies test preparation and saves time.
- Additives (defoamers, wetting agents, ...) should be delivered individually and separate, not pre-mixed with the liquid or solid. It is entirely possible that the supply of less or more additive will be required than with other processes. The additives can be added to the product as needed during production, as long as no negative effects are expected.
- The liquid can be delivered ready-mixed, as long as it has no negative effect on the manufacturing process or product quality.
- Basically: the fewer individual components that must be weighed on site, the quicker, cleaner and less prone to error is the test.
- Liquid that is retained in the current production process for cleaning purposes should, to the extent possible, also be available for dispersion in the Epsilon. This means that this liquid could already be added to the process as needed, should the viscosity become too high.
- Special cleaning agents should be supplied if required.
- Empty containers should be supplied for returning the product and any rinsing/cleaning agents should be supplied.



Batch Size

- Minimum liquid supply at the start:
 - Approx. 60 liters for low viscosity < 1000 mPa
 - Approx. 80 liters for higher viscosity > 1000 mPa
- Maximum product volume, finished product:
 - 200 liters
- Because air can also be incorporated into the product when the powder is drawn in, it is possible that the actual volume is greater than the theoretical calculation indicates. (The air is usually removed from the product during the second dispersion sequence in the Epsilon.)
- The amounts of liquid and solids must be planned such that the minimum liquid supply is reached prior to feeding the powder and the maximum product volume is not exceeded with the finished batch. In extreme cases, the batch tank can hold almost 250 liters, for example, if the product tends to foam or absorb air.

For deviations from the volumes stated above or questions about the trial, please contact:

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Capacity

- If complete cleaning is not required between test batches, approx. three to four tests can be run per day.
- When cleaning between tests, for example if changing colors or to prevent product cross-contamination, a maximum of approx. two tests can be run per day.
- For tests that require very slow dosing of powder and thereby longer processing times, a maximum of approx. two tests can be run per day.
- For products that are extremely difficult to clean, it is possible that only one test can be run per day. However, this is seldom the case.
- Basically: anything that requires extra time reduces the number of possible tests per day. In particular, tasks that require extra time include:
 - complete cleaning
 - weighing and filling several components

Documentation


The test is documented with the aid of test protocols, which are tailored to the machine technology. The protocol includes the formulation, the key parameters during production and additional comments if necessary. The customer receives the test protocol as a PDF file.

EPSILON 30

Technical Data

Technical Data	<i>EPSILON 30</i>
Powder induction rate [kg/h]	50 - 3,500
Liquid flow during powder induction [m ³ /h]	ca. 15 - 30
Liquid flow at circulation [m ³ /h] (closed powder valve)	67 (water)
Power [kW]	30
Max. rotor speed [1/min]	3,600
Max. pumping pressure approx. [bar]	3
Min. feeding pressure required [bar]	0.1 - 0.5





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