

INTRODUCING LIQUIDS TO A POWDER MIXTURE

“a piece of cake”

Mixing of powders in a batch mixer generally is not so straight forward when compared to the mixing of gasses or liquids. Powders have properties (e.g. cohesive, free flowing or agglomerates) you will not find in liquids or gasses.

Because of these phenomena powder mixtures can be rather complex. Mixing processes where liquids need to be introduced into a powder batch are even more complicated.

For powder mixtures the correct mixing technology needs to be chosen based upon the properties of the powder and the requirements upon the end product. Based upon these challenges, there is need to use many different types of mixers for different applications. The Hosokawa Group has a full range of mixers.

The latest development is the **Vitomix** a highly flexible mixer, able to combine both gentle and low shear mixing with mid shear mixing (e.g. for reduction of mixing time). With introduction of the **Vitomix** as a mid shear mixer, the process of the addition of liquids in a powder has become a “piece of cake”.

Addition of liquids

The mixing principle of the **Vitomix** is based upon the Vrieco Nauta[®] mixer. However by making use of a different configuration of 2 screws and higher rotational speeds a fluid bed can be created at the top of the mixer. At this place liquids can be introduced. A perfect ratio between the liquid, powder and air is resulting in a homogene powdery material containing liquid, fat or oils **without any lumps**. Therefore lump breakers are no longer necessary for breaking up lumps which are normally created with other types of mixers when injecting liquids into powders.

For example the injection of 20% (w/w) of vegetable oil into flour is done within minutes. Also injection of butter (>30% w/w) into bakery products is resulting in a powdery mixture without lumps. Again all without the use of lump breakers. Since the lump breakers are no longer necessary fragile materials or not destroyed or reduced in size. This is making the **Vitomix** very interesting for liquid injections.



FOOD CASE STUDY

Flexibility

In the industry there are a lot of combinations of processes necessary to make an end product. For these processes different types of machines are being used.

As mentioned in the introduction for powder mixtures the correct mixing technology needs to be chosen based upon the properties of the powder and the customer requirements upon the end product. Therefore it is possible that after a liquid is introduced in a mixer, using high or mid shear, a second mixing step using low shear (for mixing in fragile materials), needs to be made in a different type of mixer.

The **Vitomix** can operate in the mid shear zone but also in the low shear zone. This makes it possible that after the introduction of liquids (mid shear), fragile components can be mixed in at low shear without damaging the product structure of these fragile components.

Low in energy consumption

Another advantage of the **Vitomix** is that it can not only make the liquid/powder mixtures without using lump breakers but it can also make the mixtures in short mixing times. Due to the benefits of the mixing principle of the Hosokawa **Vitomix** resulting in short mixing times and the fact that no lump breakers need to be used, the energy consumption of the **Vitomix** is, compared to any other type of equipment used for the same process, very low.

Overall the VITOMIX is a unique machine which combines:

- the possibility of introducing liquids without the use of lumpbreakers
- combination of mid shear and low shear mixing in one machine
- short mixing times, also in the low shear zone



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