



Dust-free Induction of Diatomite with the TDS-Induction Mixer



Diatomaceous earth is used as a filter aid for the clarification of turbid beverages. The risk when using diatomaceous earth is well known since a long time. Respirable dust from diatomaceous earth is highly dangerous to health. It may cause silicosis and lung cancer.

Especially the crystalline silica (Cristobalite) in the diatomaceous earth is very critical. In the year 1998 the crystalline silica was completely new evaluated by an international committee and upgraded to the highest category of risks.

There was proved a significant risk of mortality from cancer, so it is now classified in the first risk group, this means „serious carcinogenic effects on human beings“. This decision has a crucial effect on the personal protection of employees and legal consequences. It is no longer allowed to handle diatomaceous earth without any protection. Dust, as it occurs when pouring a bag, has to be avoided absolutely! Unfortunately the daily practice looks completely different.

Thereby the solution is very simple: instead of pouring the diatomaceous earth onto the surface, it is inducted directly into the liquid using an **ystral-TDS-induction mixer**! The TDS-induction mixer – while it mixes the liquid – produces a vacuum in its mixing head. This vacuum is used to induct the powder into the liquid. Neither lifting bags nor pouring powder is required anymore. The powder is inducted directly from the bag using an induction tube and an induction hose. The immediate wetting of the powder occurs in the mixing head below the surface of the liquid. No dust comes out from the surface of the liquid. No dust exhaust system on top of the vessel required.

During the induction of the powder out of a bag using the induction tube an air flow occurs from the outside into the bag. For this reason no dust comes out of the bag during the induction. The bags are emptied complete and clean. If just a partial

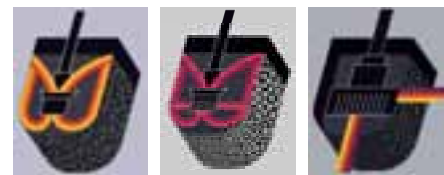
amount of the powder is required, the bag may be placed on a scale and only the required amount of powder is inducted. The TDS-induction mixer is a special version of the Jetstream mixer. The jet stream principle is suitable especially for diatomaceous earth suspensions as they are known for their strong sedimentation.

Depending on the volume of the vessel, different sizes of machines are offered. The induction rate reaches up to 20 kg/min (40 lb/min). But even more is possible with the TDS-induction mixer: with a CO₂-connection, the same machine may be used for the substitution of Oxygen by CO₂ in the liquid.

TDS-machines allow an almost dust-free handling of powders. The risk for the operator is reduced to a minimum. In the magazine „Diatomaceous earth“ of the Employer’s Liability Insurance Association for food industry in Germany the TDS induction mixer is recommended for that reason. The investment for a TDS induction mixer is really very low compared to the installation of a dust exhaust system or the consequences of an inadmissible handling of the powder (serious damages to someone’s health, legal disputes etc).

By the way: The TDS-induction mixer is suitable for the induction of Activated Carbon as well!

Jetstream Mixer and Multipurpose-Machines



Jetstream mixers are known for their vertical mixing principle. Different to conventional stirrers they provide an effective mixing and homogenous suspension. The mixing head creates a strong stream, directed to the bottom of the vessel. On the bottom of the vessel, the stream is separated and redirected to the surface of the liquid. Because of this stream the contents of the vessel is completely mixed in a vertical manner. For this reason one of the main fields of application is the mixing of all products, which require a good homogeneity in any kind of small or large vessels.

Jetstream mixers are available for top entry, bottom entry or side entry installation. Large tanks with raw milk for exam-

ple can be mixed with rather small machines.

The **Multipurpose machine** is a version with interchangeable tools. A coupling allows a quick exchange of the mixing shaft. The machine may be used as gentle mixer, as a Dispermix for fast dissolving of thickeners, as an intensive disperser or as an emulsifying machine. Very often the multipurpose machine is attached to a moveable lifting column. That’s way it can be used in barrels and containers.



Stabilising of Fruit Juice, Milk Mixtures and Yoghurt Drinks



Beverages always contain components with a different density or structure. To avoid creaming, sedimentation of floating particles or a modification of the structure, very often Hydrocolloids are used as stabilisers.

These **Hydrocolloids** generally are highly active thickeners, designed for the respective application. They are available as powders and because of their thickening effect, they are only applied in very small concentrations. Because of their special properties they are always difficult to treat. Very often they are dusty, sticky and they form lumps and agglomerates, which again have the tendency to stick to the wall of the vessel or to the mixing tools. They are difficult to mix in and float on top of the surface of the liquid. If high

mixing energy is used to pull them downwards from the surface of the liquid, then always air is poured into the liquid via the resulting Vortex.

ystral offers two different systems that avoid these problems. The **Conti-TDS** (left picture) is a machine, which is installed outside of the vessel - similar to a pump. The powder is inducted from a bag, funnel or container and immediately dispersed. The machine may be connected to one or more vessels. Even for the additional dosing of stabilisers into ready-made products, the machine provides a perfect decomposition and a homogen distribution in large vessels.

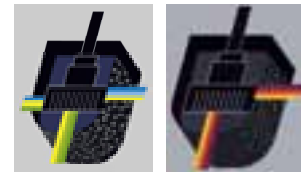
The machine itself builds up the required vacuum, no additional conveyor or vacuum vessel is required. No additional pump is necessary to transport the liquid. Of course the machine can be used to induct other powder materials, fruit pulp or liquid components as well. With the Daitec-Conti-TDS shown on the left side for example six bags of skimmed milk powder may be inducted in just one minute.

A completely different method of stabilising beverages is the incorporation of **Bentonite** for clarification or the absorption of proteins. With the Conti-TDS Bentonite may be inducted and dispersed directly into the fruit juice.

Alternatively to the Conti-TDS a Dispermix (pict. below), a combination of Jetstream mixer and disperser, is available for the installation inside a vessel. This machine has the capability, to break down agglomerates very quick in its dispersing zone and simultaneously homogenise the complete contents of the vessel. As the machine has no open stirring shaft, no vortex builds up and no false air is incorporated into the product.



Production of Concentrates with Inline Disperser and Conti-TDS



Beverage emulsions are high-grade dispersions with a very narrow and very low drop size distribution. During storage they should not start to cream or sediment and they have to provide a stable turbidity.

For these emulsions very often extremely expensive high-pressure homogenisers are used. **Inline-dispersing machines** from ystral (pict. below) fulfil the required specifications for just a tenth of the normally required investments. They are very effective, service friendly and simple in its

construction. Many users have confirmed that 95% of all beverage emulsions can be produced with our Inline dispersing machines very well. To disperse and homogenise **fruit flesh** and **pulp** they have been applied as well.



For the production of **spray dried beverage concentrates**, very homogenous and finely dispersed emulsions and solutions have to be transferred into a user-friendly powdery form. Therefore some carrier materials such as Maltodextrine, Arabic gum and emulsifying starches are mixed into the spray emulsion. The **Conti-TDS** is able to induct and disperse all these powders and the aromatic oils as well. The product is dispersed to the required droplet size without using a high-pressure homogeniser. A maximum concentration of solid materials is possible. This maximises the effectivity of the spraying process.