



Vinegar Infos

Mixing of Liquids through Recirculation of Air

The uniform mixing of large liquid quantities has always been very important in vinegar plants. For good reasons, this procedure has been considered to be difficult, and in fact, the difficulties of a uniform mixing increase in the same measure as the size of the vats, so that a simple mixing by hand became impossible.

Subsequently, agitators with large wooden arms were designed which were turned manually from outside or by means of a motor with belts or gear. Frequently, it was not possible to obtain a good mixing, even after more than one hour.

The knowledge of the insufficient and inefficient mixing with these wooden agitators led to a circulation by means of a pump. The effect of this mixing method was relatively useful when applied correctly and carefully (special shape and low residence time of the inlet pipe), but the consumption of time and energy remained unsatisfactory.

Today's working conditions make the time required for the mixing of denaturate and mash a decisive factor. Frequently, it is necessary to prepare a mash in a very short period in order to have it ready for a new charging procedure. The high expectations with regard to the obtainable yield also require an extremely precise mixing of the mashes and a uniform acidity of the vinegar to be sold, in order to avoid unnecessary losses.

A quick mixing of large liquid quantities requires that parts of the liquid are set into intense motion against the remaining liquid and generate turbulences at their contact points.

This problem can be solved most thoroughly and cheaply if large air bubbles are periodically introduced into the liquid so that the rising large bubbles act like a piston driving forward the liquid above it. This requires a certain minimum quantity of air, an air pressure higher than the resistance of the liquid column to be aerated, and a device permitting the mixing process to take its course without any control so that, after a preset period of time the device stops. This avoids material loss by evaporation due to excessive aeration.

The FRINGS Air Impulse Mixer meets these requirements. It consists of a special air pump which is driven by an electric motor for a periodic introduction of large air bubbles into the liquid.

The practical trials in various plants have proved that this mixing unit provides for a good, safe, and uniform mixing: in small vats (3000-5000 liters) within 5 minutes, in medium-sized vats in about 10 minutes, and in large vats within a maximum of 15 minutes, provided that the vats have a normal shape and that their diameters are smaller than their height and no larger than approximately 4 m.

In case of especially large or very long, flat vats, it is not sufficient to introduce the air bubbles through the provided valve as in normal vats, but air must be introduced at various places, for instance through a tube from above.

A special control or supervision during the mixing process is not necessary, as the unit is turned off by a timer. The vats, contents of which are to be mixed by the FRINGS air impulse mixer, should not be filled completely in order to avoid liquid overflows during the intense mixing procedure, and all tank lids should be vented.

If in your factory a frequent or even continuous mixing is required, as for instance for mash mixing, we recommend the installation of a stationary, solid pipe for the air to be introduced. The U or hairpin-shaped pipe can be laid up above the filling level of the vat and then returned to the mixing group. Its upper bend should have a small air hole in order to avoid undesired siphoning effects.

The FRINGS Air Impulse Mixers are available in two sizes:

- K 34 for tanks up to a max. capacity of 50,000 ltrs. and a max. inside height of 4 m
- K 37 for tanks of a capacity of more than 50,000 ltrs. and an inside height of more than 4 m.

The FRINGS Air Impulse Mixers are not suitable for pumping liquids.