



AMX AGITATORS IN FOOD & BEVERAGE

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introduction

The food & beverage industry utilise various mixer types to process their products. AFX has key industry knowledge on the process involved in manufacturing and continues to engage with plant engineers to create improvements that include higher product yields and more robust products. Having interacted with these plant engineers, through the different stages, AFX was able to fully conceptualise the importance of equipment which far exceeds client's expectations, as well as constructing a new approach for targeting their markets. By understanding the plant requirements, we can design and manufacture agitators and peristaltic pumps to the required specifications, adhering to industry standards.



dairy industry

The dairy industry has a number of stages involved in processing milk-based products. Milk is transferred to receiving stations which require vigorous agitation of the milk followed by storage tanks that require mild agitation. AFX can assist with the design and supply of the required agitators throughout the dairy based products which include but are not limited to; bottling plants, cheese factories, creameries, condensories, dry-milk plants, ice-cream plants and yoghurt plants.

Knowing that most of the agitators running in dairy processing plants formed part of a complete package when purchasing mixing and storage tanks/vessels, AFX aligned its engineers to work closely with the tank manufacturers, thereby ensuring that the provided solution is appropriate for the process requirement.



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vegetable & animal
processing

The processing of vegetables and animals is intricate and most facilities host a range of equipment which takes the vegetable plant or animal matter from 'raw' to the 'end' product. Certain areas of the food processing industry utilise agitators.

AFX worked closely with a food processing company, producing soya bean meal for feeds and was commissioned to design the agitator for a 15 000-litre storage tank. Certain elements of design were considered, and a prominent issue was that there was a constant buildup of residue and fine particles left in the oil after the final processing. The client needed to empty the tanks monthly to scrape and clean the bottom of their storage tanks. This meant that they were operating inefficiently as they only had a single storage tank in commission at any one time. AFX compiled a design to suit their tanks and process thereby ensuring that the residue and fine particles did not settle on the bottom of the tanks.

Certain process stages, such as hydrogenation, the reaction is strongly exothermic and the agitator aids in the removal heat from the reaction thereby maintaining temperature uniformity throughout the products in the agitator. AFX specialises in providing a solution for your agitator requirements in the manufacturing process or storage phase.

bottling industry

The bottling industry covers processes that are not limited to syrup mixing and storage, pulp blending and suspension with fruit juices and speciality drinks and sodas. Agitators are used to ensure product uniformity and achieve process results for the desired products.

AFX fully understands the fundamental parameters that influence the sizing of the agitators from syrups and sugars, to ensuring that the product quality in juice blending is not compromised, as well as paying attention to the smaller batch mixing that occurs throughout speciality drinks and supplies a suitable agitator solution. AFX guarantees a quality product, process success while maintaining an energy and maintenance efficient design.

AFX has designed a hydrofoil impeller which has proven to be beneficial for these types of applications.

AFX has the expertise to modify its designs and thereby giving the appropriate performance to its impellers.



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brewery, winery & distillery

Although dating back many years, the making of alcoholic beverages has progressed and having recently improved the processing methods, including agitation, the industry has modernised, resulting in improved production yields and superior products.

Agitators are found in the following Brewery processes:

- **Gelatinisation:** With high viscosities, top entry agitators, using axial flow impellers, are mostly used in this step. The design of these agitators takes into account the viscosity and the rate of grain addition along with the heat transfer requirements thereby optimising the design of the agitator.
- **Mash Tun:** This phase is a rather delicate process requiring a high flow of the product through the vessel, ensuring that the grain is thoroughly wet down in the tub, however, through this steeping phase, the shear rates are required to remain low. AFX acquires the required product information and process parameters and designs the agitator to achieve the desired process outcome. The most commonly supplied agitator to this process is the top entry agitator that does mixing, solid suspension and temperature and material uniformity.
- **Brew Kettle:** This step in the process is a fairly simple step in comparison to the other steps. The process uses a side entry agitator design which achieves the desired wort and hops uniformity and temperature uniformity throughout the mix. These designs normally have a lower installed power as the wort is water like and the settling rate of the hops is mostly negligible.
- **Fermenters:** This stage of the process initially would have been un-agitated. The more modern designs see fermenters with a side entry installation agitator. Mechanical seals are used to maintain the stringent sterility requirements. The design of these agitators provides a light, gentle mix throughout the fermentation tank, acknowledging that the process requires very little shear.
- **Filter Aid Slurry Makeup:** This process forms the final filtration process of the beer production process. The makeup of the filter aid requires very low shear as the filter aid is easily broken up. The agitator's aim is to provide a uniform slurry. The most commonly used agitator is the top entry axial flow agitator. Once this filtration process is complete the beer moves to the bottle house for packaging.

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winery operations

Agitators are used for various applications throughout the wine making process, some for solids suspension and others for blending components.

Agitators may be found during in the following Wine processes:

- **Storage & Mixing:** Agitators are used to improve filtration rates by ensuring that there is a uniform feed to the filter, as well as aiding in the juice recovery and reducing the primary fermentation time for making heavier bodied wines.
- **Fermenter Makeup:** Agitators are used to perform blending within the fermenter tanks to provide good quality control over all components before fermentation.

Many of the applications in the winery and distillery operations require the design of agitators using both top and side entry designs. As production capacity and demands increase, so do the mixing vessels.



This leaves room for the agitators to be adapted to suit the vessels. In very large mixing vessels, top entry agitators may not be economical or may not be an option due to height restrictions or even weight and load limitations. Due to the mixing and blending of this type of product, the use of side entry mixers has become a defacto standard in this process. The side entry units utilise less space, provide an economical solution in oversized mixing tanks, and still achieve the desired process outcome.

Throughout the starch processing stage and fuel alcohol processing stage, there are numerous applications where agitators are installed. The agitators are used to ensure that there is product uniformity throughout the tank and to allow for an evenly distributed mixture as well as aid in shortening the time periods which such processes would normally require. Agitators may also be installed for solid suspension within tanks thereby avoiding sediment build up and aiding in producing homogenous mixtures. The fluid regimes required in the process are important, and AFX can advise on agitator positioning as well as baffling designs to suit the process demands.