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Are You Using the Right Tank Design for Your Industrial Mixing Application? (Part 3)

EMULSIFICATION, GAS DISPERSION AND ABSORPTION, CRYSTALLIZATION AND HEAT TRANSFER

In part one and part two of our blog series on tank design, we discussed tank design considerations for liquid blending, solids suspension, dispersion and dissolution applications. The final blog in this series focuses on mixing tank design for four more mixing applications: emulsification, gas dispersion and absorption, crystallization and heat transfer.

Mixing Tank Design For Emulsification Applications

Emulsification mixing processes almost always require a vertical round vessel. The vessel should be selected so that the static height of the greater component is no higher than the vessel diameter. The industrial mixer can be designed with angle offset mounting in a non-baffled tank, but we normally expect to see a center mounted mixer with baffles installed in the vessel. Many emulsions are very viscous, and often require scraped wall agitation in conjunction with a second high speed disperser mixer in the same tank. Needless to say, these mixing vessels are always round.

Mixing Tank Design for Gas Dispersion and Absorption Applications

Gas dispersion and absorption mixing applications almost always require a vertical round vessel. This is one of the few cases where tall skinny mixing tanks are preferred, and some have aspect ratios greater than 3.0. Because gas dispersion is almost always a turbulent operation, round tanks with baffles are required. Offset mounting is strongly discouraged because irregular unbalanced hydraulic forces will be very large. This requires costly “oversizing” of the industrial mixer in order to prevent destructive vibration.

Mixing Tank Design For Crystallization Applications

Mixing tank design for crystallization applications is similar to solids suspension applications. However, there are many specialized “crystallizers” which utilize the technology providers designs that incorporate a draft tube that uses unique mixing tank designs for individual applications. These mixing tanks are configured on a case by case basis. Please contact ProQuip if you need assistance with your tank design for a crystallization application. Other crystallizer designs may use jacketed, round vessels.

Mixing Tank Design For Heat Transfer Applications

Mixing tank design for heat transfer applications has much in common with tank design for liquid blending applications. However, in heat transfer applications, a heat source (or sink) is installed in the mixing tank. These may be pipe coils, plates or the mixing tank may be jacketed. Jacketed mixing tanks are almost always round and usually used when scraped wall agitation is expected. However, a jacketed mixing tank can also be used in most other circumstances.

There are also a great variety of coil arrangements used for heat transfer. Some coil assemblies can serve as baffles, but when they cannot, baffles must be installed in the mixing tank when required. Baffles can also be the coil supports with a projected baffle area similar to the baffle area used if there were no coils.

For More Information

Click the following links for more information about emulsification, gas dispersion and absorption, crystallization and heat transfer mixing applications. If you need help with mixing tank design for these applications, email applications@proquipinc.com or call us at 330-468-1850.