



Glass-lined Reactor with Three Baffles Boosts Productivity, Quality, at Pharmaceutical Plant

SALIN DE GIRAUD, FRANCE - Solvay Specialties has replaced a 660-gallon (2,500-liter) glass-lined agitated reactor at its Pharmaceutical Chemistry Unit to resolve two process problems: inadequate suspension of a solid reactant (which tended to float on the surface of the organic solvent used in the process), and a scarcity of injection nozzles on the top of the vessel which limited the introduction of raw materials.

The company has overcome these problems by means of a novel glass-lined reactor from De Dietrich Process Systems that has three baffles attached to the reactor wall. By comparison, conventional glass-lined reactors typically have a single baffle extending downward from a flange located at the top of the vessel.

The tri-baffle design creates significantly greater turbulence, thereby improving mixing efficiency, solids suspension, and heat and mass transfer, according to De Dietrich marketing manager, Jean-Marie Eslinger.

Traditional reactors have employed a single baffle over multiple baffles for two reasons, explains Eslinger. "Primarily it is due to the challenge of attaching baffles to the reactor wall and encapsulating them with glass. The second reason is that the mounting flanges consume the space otherwise needed for nozzles through which to inject reactants, monitor the process, or insert cleaning devices."

The patented design, trademarked OptiMix, is said to resolve both issues. "The baffles are welded to the reactor wall prior to coating all steel surfaces with glass," says Eslinger, adding, "Three baffles are used-the same as the number of agitation blades-to prevent the occurrence of undesirable vibrations."

Solvay has been producing a pharmaceutical product in its OptiMix reactor for 10 months and has obtained an improvement in mixing efficiency over that of the previous, conventional reactor, reports M. Romain Pleuvry, a Solvay process engineer. He says the new unit has eliminated the problem of solid particles flotation at the surface of the reaction medium, and that the absence of a baffle flange mounted atop the reactor has freed room for a large nozzle that is used to introduce raw materials. The combination of these improvements has resulted in a productivity increase according to Pleuvry.



Three sidewall-mounted baffles of this 4,000-gallon (15,100 liter) Optimix reactor reduce mixing time by one-third. Reductions in vortexing minimize the amount of product that dries and sticks to reactor wall, and can eliminate splashing of the reactor head. Shown with GlasLock agitator with two tiers of HydroFoil blades.



Compared with a single baffle extending downward from a flange located at the top of the vessel, the tri-baffle design creates significantly greater turbulence, thereby improving mixing efficiency, solids suspension, and heat and mass transfer.

With the OptiMix design, mixing efficiency of glass-lined reactors can equal that of metallic reactors which, says Eslinger, previously held an efficiency advantage because multiple baffles can be installed directly on metallic vessel walls.

Another advantage of the OptiMix design is that the absence of a conventional baffle eliminates dead zones where the baffle enters the vessel through the top head, and allows easier cleaning of the reactor between batches.

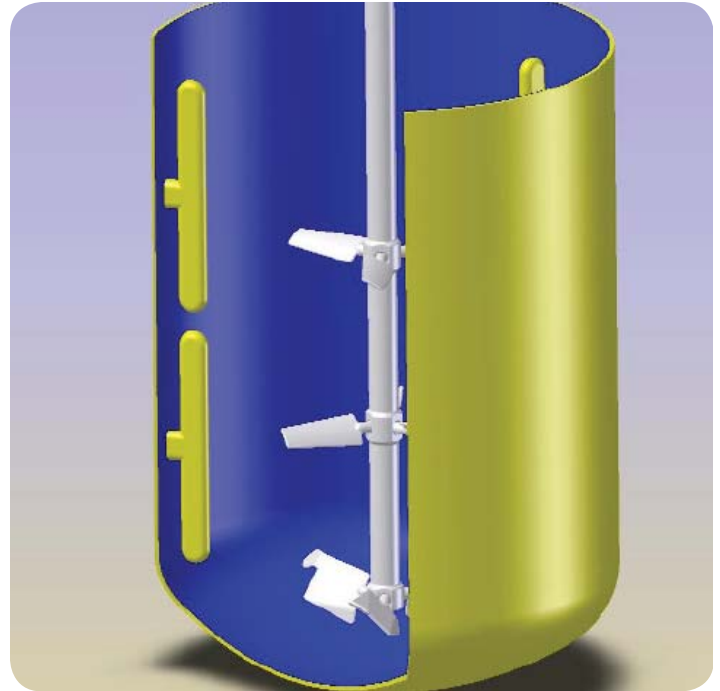
Vortexing and splashing are also reduced significantly, reducing the amount of product that dries and adheres to the heated wall above the surface of the process liquid.

The design also allows OptiMix baffles to be retrofit during re-glassing at about half the cost of a new reactor. After shot blasting to remove all glass from the reactor interior, baffles are welded to the reactor wall, after which all interior surfaces are encapsulated with glass, giving the reactor a second life while reducing mixing times by one third."

OptiMix reactors are offered with a standard jacket or a Hemi-Coil (half-pipe) jacket in capacities from 20 to 10,000 gallons (75 to 38,000 liters) with larger sizes available on a custom basis.

Solvay is an international chemical and pharmaceutical group with over 30,000 employees in 50 countries.

De Dietrich Process Systems is an international provider of glass-lined vessels, instrumentation and accessories; filtration, mixing and drying equipment; and turnkey process plants and associated equipment.



Three baffles are used in OptiMix reactors to match the number of agitation blades, canceling radial stresses that would otherwise be incurred by the hub.