

Chemical

Reactor for Pigment Production

Large shearing forces are required for the production of certain pigments in order to achieve high colour intensity. For this reason, such pigments are normally produced with the help of kneading / disc dryers, which inevitably provide shearing forces due to their inherent design. The material and the time and energy required for their design makes these devices extremely expensive, especially when special materials are used.

A multi-national pigment producer was willing to modify its production methods and to undertake initial tests at the technology centre to find out whether a modified paddle dryer adapted to match the corresponding operational conditions could be used to replace its aging kneading / disc dryers. The dryer was to be used both for pigment production as well as for drying.

The drying of pigments from nutsch filters and filter presses proved to be no problem whatsoever. The usage of choppers served to shorten the drying times considerably. In fact, the products created were, if anything, superior to those from the kneading / disk dryer. The central point of the tests was the production of one of the customer's important pigments in a batch reaction. The delicate reaction occurs in an aggressive solvent and at high temperatures. The reaction mixture is largely tough and tends to cake. The end-product has to be free of lumps and may not stick to the container or the agitator parts. Before the tests, there were also concerns that the usage of choppers to facilitate the creation of shearing force may negatively influence other important parameters, for example, that the grain size could be drastically reduced. Even worse would have been if the bulk weight would have increased dramatically, which would have meant that the packaging for the extremely successful product would no longer be suitable. In a series of reaction and drying tests, both carried out in long-term tests overnight, the usage of the chopper was gradually increased. It was soon clear that the longer the chopper was used, the better the product became. The caking on the wall and agitator actually decreased. The product became fine-grained and more fluid. Finally the pigment produced at the technology centre came within the physical specification range and also reached the required colour intensity.



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The extrapolation of the test conditions lead to an AVA paddle dryer of type HTC-VT6500, product contact in stainless steel 1.4462, with 6,500 liters gross volume, heated shaft and heated paddle arms. Multiple lip washer seals stable to 340°C were used for the sealing of the mixer shaft and the chopper shafts. The machine is currently in use to the utmost satisfaction of our customer and was able to more-than-satisfactorily replace the kneading / disc dryer.

