

Process monitoring for the continuous tableting line ConsiGma using in-line measurements

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Several advances are taking place in pharmaceutical production processes nowadays [1]. The focus is on the formulation of the Active Pharmaceutical Ingredients into final drug products. One specific point of progress in industrial applications is the change from batch-wise to continuous production processes [2-3]. The traditional batch processes rely mostly on off-line time-consuming and less efficient laboratory testing to evaluate the quality of the product [4]. Continuous production processes, relying on in-line measurements and real-time adjustment of sensitive process variables, would be a step forward towards more efficient production processes. A batch is well defined, and as such it is easy to perform a quality assurance, since a batch can simply be accepted or rejected. However, monitoring the process during continuous operation and being able to interfere during production is more economical as the loss in product is limited, and less waste is produced as such [4-5].

In this contribution the real-time in-line measurements of the continuous from-powder-to-tablet manufacturing line (ConsiGmaTM, GEA Pharma Systems) are used to follow-up and control the process. The continuous line consists of three parts: a continuous twin screw granulator (high shear), a six-segmented fluidized bed dryer system and a discharge system. A large number of variables are continuously logged and allow making a mass and energy balance over the fluidized bed dryer unit. By making of mass balance of the water content over the dryer unit the moisture content of the granules leaving the dryer can be calculated, which is based on an increase of the humidity of the air passing the dryer.

Based on several datasets, it can be concluded that it is indeed possible to use the standard logged measurements to monitor the process. As such, an important conclusion is that expensive probes (e.g. NIR [6]) are not always needed to implement in the final production system, but are extremely useful in process development to support development of detailed process knowledge.

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