Environmental technology

WE2107 – Weighing and batching electronics

The Bavarian State Research Center for Agriculture (LfL) relies on HBM weighing

Lab-based research studies for optimizing the methane yield and managing the process control of anaerobic digestion of renewable raw materials developed an automatic filling device that continuously loads the fermenter system with substrates.

Fig. 1: Automatic fillers for the continuous and automatic operation of lab-based biogas fermenters

Automatic batching

Investigations should be carried out with different energy crops, which are used for methanization as a monosubstrate and in mixes. It is essential to ensure that the lab-based systems can be loaded over two days, without manual intervention.

Intelligent process control – accurate to the last gram

Substrates are inhomogeneous mixes (silage), in which demixing and variation caused by drying out or anaerobic decomposition, are to be avoided. There are similar requirements to be met in automatic feeder technology. Which is why the components of automatic TMR feeders for sheep have been modified accordingly.

The base is an enclosed stainless steel hopper with a substrate conveyer and dispersal system and a precision-controlled batching auger. This conveys small quantities of the material to a scale pan, in which the weight of the batched quantity is checked down to the last gram before being loaded into the fermenter. A process control regulates the timing for batching and logs the batched quantities. Any variation from the target quantity can be automatically corrected for each subsequent batching process.

Fig. 2: Scale pan for loading the substrate

Fig. 3: The HBM WE2107 weighing indicator controls the batching routines

technology

Results

For average volumetric loadings of 1 to 3 kg/m³ and corn silage, it is possible to obtain good results with daily variations from the target value of less than 10 g. There are constraints with a lower volumetric loading, that is, daily batched quantities in the less than 10 g range, as well as for materials that dry out a great deal (grass silage, for example). Work is being done on a modified storage and dispersal system, so that the batching device can be used for these substrates as well.

The WE2107 weighing indicator ...

... can be used both for legal-for-trade weighers (non-automatic scales) with an "alibi memory" and for non legal-for-trade dosing systems for additive or extract batching. Easy to use batching routines with all the requisite control functions (I/O contacts), easy operator guidance and process-optimizing controls are available specifically for batching applications.

Varied application options with an outstanding price/performance ratio mean that for many users, this device is the weighing technology standard.

Hermann Merz, HBM

more ...
www.lfl.bayern.de (in German language)
www.hbm.com/weighing

Tank weighing RTN, C2, U2A

Some like it hot

The requirements load cells have to meet can vary tremendously, depending on the type of scale being used and the area of operation. They have to adapt to the task set for the weigher in the best way possible, not just geometrically, but also with regard to accuracy.

It is not rare for weighing devices to face extreme ambient conditions. As well as familiar effects such as moisture, corrosive media or electromagnetic interference fields, with blast furnaces, coking plants or drying kilns, high ambient temperatures also have a role to play.

The weighing instrument components in applications of this type must not become damaged even at high temperatures and must retain their metrological properties.

HBM load cell types RTN, C2 and U2A are prepared for such a task. In special versions, they can withstand temperatures up to 120 °C, without damage.

Rudolf Almendinger, HBM

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Fig.: Load cells are frequently exposed to unusually high temperatures