On Solid Ground

Use of measurement and control technology in composting plants

Nowadays, composting is no longer something which only takes place in people's gardens, but is above all carried out on a large scale by local authorities. In Germany, more than 1,000 composting plants exist for this purpose. According to data from the German Federal Statistics Office, in 2011 around 14 million tonnes of biogenic waste was composted or fermented in biogas plants and subsequently re-used on soil in Germany. Around two thirds of the biogenic waste is used in agriculture and a quarter in landscaping.

The correct handling of biodegradable waste destined for composting is stipulated in Germany by the so-called German Biowaste Ordinance (*Bioabfallverordnung*). This is important because dangerous pathogens can emerge during the process.

According to the German Biowaste Ordinance, the specified temperatures for all batches of a composting must be documented. Proof is necessary because dangerous microorganisms are reliably eliminated as a result of the temperature in the material. This data must always be available to the *Bundesgütegemeinschaft Kompost* (Federal Compost Association).

During composting, a temperature of more than +55 °C must act upon the entire mixture for, if possible, a consecutive period of two weeks, or +65 °C over one week. The treatment temperature must be measured and documented in regular intervals – at least once per working day. Devices used for temperature measurement must be calibrated regularly – at least once a year – and the calibration must be documented. Only if documentation of the indirect process control is verifiable at any time can the manufactured composts be deemed hygienically harmless.

Often, this temperature check is carried out manually by the operators of composting plants. The costs for personnel are correspondingly high. Disposal provider "GfA Lüneburg - gkAöR" has chosen the JUMO mTRON T automation system and JUMO Wtrans B wireless temperature probes. As a result, the process is monitored completely automatically and documented in a tamper-proof way. Two JUMO mTRON T central processing units, two JUMO mTRON T multifunction panels, 48 Wtrans temperature probes, and four Wtrans receiver units are used for this purpose.

By building up the heap (pile for composting), the batch recording is started. In total four temperatures are recorded per batch. The temperature probes, which are 1600 mm in length, are inserted directly into the heap for

measurement. These are equipped with a JUMO Wtrans wireless temperature system in which the transmitter is located in the probe handle and is protected by watertight housing. The used radio frequencies are largely impervious to external interference and allow transmission even in harsh environments.

The probe contains a platinum chip resistor as its sensing element. On the transmitter side, a temperature measuring range of -30 to +85 °C is achieved. Up to 16 JUMO Wtrans transmitters can be managed per receiver via the RS485 interface.

With the JUMO mTRON T system, the clear overview of all recorded values impressed the most. The multifunction panel enables not only visualization but also user-dependent access to parameter and configuration data of the overall system. In addition, a special feature of the JUMO mTRON T is the implemented data recording – fully-fledged and tamper-proof – and the implemented web server. Both functions are an ideal basis for the application at hand.

Proven PC programs are available for extracting and evaluating recorded data. Using standard predefined screen masks, startup times for the user are considerably reduced. The entire process of temperature monitoring and documentation is now much simpler for GfA Lüneburg thanks to the implemented solution. The data no longer has to be recorded manually with a lot of effort, but instead it is automatically documented and logged for the hygiene certification. In addition, the use of individual data loggers is no longer required. A particularly great advantage has proven to be the minimal effort required for programming and on-site installation.