Reduced drying time optimises operational processes in waste management technology

Since 1st June 2005, in Germany unprocessed waste may no longer be disposed of at waste sites.

Environmental technology: bio mass reduces emissions in cement production

Waste-to-energy concepts (energy from waste) are using various technologies to pursue a common goal of utilising the energy content of waste to supply heat and electricity. For nearly all waste-to-energy solutions, moisture analysis of the materials to be processed is an essential component of the process, whether this is to calculate the heat value, or as a basis for a billing based on weight. A vacuum drying oven reduces the drying time by many hours and contributes to more efficiency and profitability.

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One of the aims of the German Closed Substance Cycle Waste Management Act from the year 1996 is to make as wide and environmentally-friendly use as possible of the material and energy potential of waste. The following principles apply: Avoidance before reduction before utilization before disposal. The use of fuel surrogates, prepared, for example, from high heat value housing estate and industrial waste, waste oil, car tyres, meat-and-bone meal, sewage sludge or scrap wood, but also from bio mass such as energy wood and other renewable raw materials, reduces the strain on the climate and on natural resources, and can contribute to a considerable reduction in the emission of pollutants. Cement factories are increasingly using fuel surrogates in cement production. According to figures from trade associations, the proportion of fuel surrogates used annually in Germany, as well as Austria and Switzerland, now lies at around 50%. Due to the high temperatures in rotary kilns, this waste can be burnt without creating noxious fumes, making a significant contribution to the reduction of CO₂ emissions in cement production.

**Water content as a crucial quality parameter**

The water content of a fuel surrogate is one of its most important quality characteristics. If the moisture level within materials is too high, it must be removed before it is used thermally, or it evaporates during incineration, thus reducing the net energy gains. The water content on one hand therefore describes the energy content, expressed in the heat value, on the other it affects the storage capability. Moisture analysis according to the oven drying method, that is, determining the weight by extraction of moisture through convective heat, is a standard recognised procedure, but it does have a crucial disadvantage: The drying times are too long in practice. Since billing of the raw materials delivered should ideally be done according to the weight of the dry substance, the drying times must be reduced considerably.

**Moisture analysis in a vacuum oven**

As an alternative to the oven drying method specified in...
the DIN standards (e.g. DIN EN 51718 for solid fuels, DIN EN 14346 for the characterization of waste), moisture can be extracted in a vacuum drying oven. Memmert GmbH has performed a series of experiments for an Austrian cement producer in which the drying processes of waste bulk solids in the vacuum drying oven are recorded, so that the maximum drying times can be determined. With a purchased fuel surrogate quantity of up to 30,000 tons/year, a moisture content of between 10 and 11 percent makes a big difference. It can be seen that the gravimetric water content of the materials can already be calculated from the difference in weight after a few hours, making it possible to determine the exact billing value very quickly. In addition, the dried materials must be stored for a certain period so that they can be inspected for possible pollutants. As with the case of substitute fuels, the Memmert TechLab is in close contact with various customers working in the field of environmental technology. It is thus possible, for example, to integrate weighing technology into the vacuum oven with which the change in weight is measured and documented precisely, down to a tenth of a gram.

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