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PET bottle-to-flake plant in Hohenwestedt, Germany

Flaked bunch

In Hohenwestedt, north of Hamburg, Germany, one of the biggest plants for the recycling of PET bottles in Europe was inaugurated in 2013. The plant is processing about 4t/h, corresponding to an output of 2,900 to 3,000kg/h of bottle-to-flake recycled PET. The flakes meet the requirements for feeding a regranulation system that produces BTB quality.

The building of the recycling plant was combined with the re-establishment of PFR Nord GmbH in Hohenwestedt. This has resulted in 27 new jobs at the site. Overall the Mensing Group, of which AFA Nord GmbH and the TM Recycling Group are also part, now employ just under 80 staff. The company is investing nearly €10m in building the new plant. According to Meyer, in addition to saving on valuable raw materials through complete re-processing of the PET bottles, Hohenwestedt's central location will make it possible in the future to avoid significant costs in transporting materials. According to information from the company, the new plant will be processing around 100t PET/day. This corresponds to around 5.2 million drinking bottles every day.

The recycling of PET beverage bottles is a challenging task, as the material occurs with a multitude of contamination types and plastic mixtures. The re-utilisation of PET beverage bottles makes high demands on systems engineering. The process is a complex one. So far, PET bottles have been pressed to bales and exported to China or other Asian countries on a large scale. There, the product is roughly washed and used as raw

material for textile production. This trend is now reversing: this precious raw material is increasingly recycled in Europe and used as raw material again. New markets have arisen, e.g. the production of thermoforming film but also the "bottle-to-bottle" recycling. The production of bottles from recycled materials is on the increase.

The plant

The material arrives in bales and is at first separated: the bales are opened and portioned. Afterwards, the single bottles are conveyed into a sorting unit. This sorting unit separates clear/transparent bottles and bottles which are manufactured out of foreign plastics by means of an infrared detection in a multistage process. Size reduction with multistage washing removes contamination and adhesive glues, separates components from other plastics (e.g. caps) and dries the final product which is resold as high-quality raw material to companies producing film or bottles with it.

Owner and operator of the plant is PFR Nord, a subsidiary of TM Recycling GmbH Group, which is already operating a plant for the recycling of agricultural film on the same site. TM Recy-

cling GmbH is active in the secondary raw material sector and processes annually up to 100,000t of post-consumer plastics. The owner is Andreas Mensing, and his company treats the waste from supermarket chains: "With the installation of this plant, we no longer have the problems associated with the export of this material."

The procedure

The procedure of the plant is simple: An optical sorting machine recognises and separates the material and the colour in a single sorting stage. The illumination unit and the sensors are placed above the sorting belt. This sorting machine combines Near Infrared (NIR) Spectroscopy and colour sensor technology in a single machine. For this part of the plant, PFR Nord chose the Austrian company Redwave, which belongs to the BT-Wolfgang Binder GmbH Group.

Afterwards, the material enters the size reduction/washing/separation/drying section of a turnkey recycling plant developed and manufactured by Herbold Meckesheim GmbH, a medium-sized machine and plant manufacturer with about 120 employees, based in Meckesheim near Heidelberg, Germany. For many decades, machines and plants for size-reduction, washing, separation and drying of contaminated and mixed plastic waste have been built here.

First of all, the bottles are size reduced to fingernail-sized flakes. The addition of water ensures a first clean-

ing effect, reduces upcoming fines, and prevents overheating. The granulator configured in wet grinding mode constitutes the plant's core and is based on a patented procedure ensuring that the bottles are forced-fed into the cutting chamber of the granulator. The neat cut, without splaying and folding of the bottle chips with neatly cut edges, is the characteristic feature of this wet grinding technique.

In a first separation step, the plastics are separated into a light/ swim fraction (polyolefines, as used e.g. for bottle caps) and a heavy fraction which sinks: PET. During a further hot wash step, glues used for fixing the labels are separated with the help of additives. After drying, the material undergoes an air separation in order to withdraw suspended particles (removed labels and dust). Thanks

to its compact construction, the low energy consumption and the high quality of the final product, the plant is particularly efficient.

The final product is filled into big bags or transported with a silo truck. The PET flakes are currently being subjected to further recycling by PET foil manufacturers in central Europe.

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