Aerocycle

Dry fibre recovery

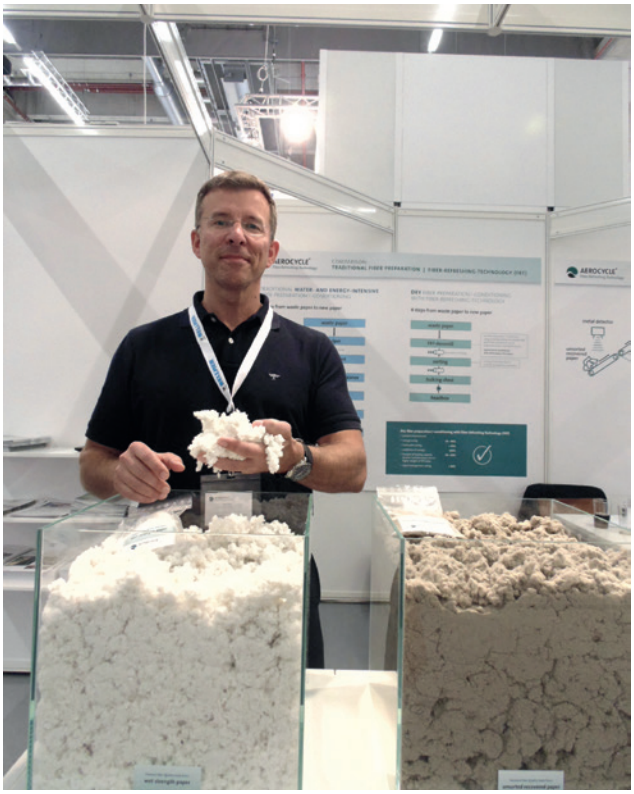
Paper recycling is an undeniable success. But what if the conventional principle could be further improved? The innovative FRT method should use up a maximum of 75 kWh/t for dry fibre recovery and sorting and does not require water. After swelling, the obtained FRT fibres are already suitable for making paper.

The inventor of this new, cost-effective and eco-friendly method for the production of pulp from various fibre-containing raw materials is incidentally no stranger to this industry: Dr. Philipp Althöfer did a doctorate on the subject of "softening and reuse of biologically recycled water circuits from paper manufacturing" and works as a lecturer at the University of Cologne. Simultaneously, in 2001, he had founded the Aerocycle GmbH Cologne – London with a special focus on biological waste water treatment.

The now patented FRT method (FRT stands for fibre refresh method) was developed within the company and presented, for the first time, to an interested public a little over a year ago. The mechanical heart of the method is the so-called FRT Aeromill, which is able to convert entire file folders in cotton wool-like fibres.

This method allows energy and space-saving, but also gentle, recovery and processing of fibres from different fibre-containing raw materials. According to Althöfer, it operates in reverse as the conventional principle: instead of 95 % water and 5 % waste paper, 0 % water and 100 % waste paper are used.

The FRT Aero mill



Philipp Althöfer at the ZELLCHEMING Expo stand this year

According to Althöfer, the basic idea is quite banal: if a pair of jeans is soiled with mud, it is much easier to let it dry and then brush off the stains. In this way, stains can be removed more easily than when mud remains on the jeans and they are immediately put into the washingmachine. "A crucial advantage of this method is that it runs dry."

Based on the principle of an impact mill, waste paper, completely filled file folders, high-wet banknote paper, cellulose-based non-woven waterleaf paper or other fibre-containing raw materials are broken down into micro individual fibres in the FRT Aeromill. In doing so, material recovery is carried out through mutual impact and friction of the particles, which are accelerated up to 50 m/s.

Through the integrated gravimetric separation and downstream magnetic sorting, specifically heavier particles, plastics, magnetic and non-magnetic metals, fillers and printing ink can be dissolved and separated from the fibre composite and reused. Thereby, metal-containing impurities are sorted out using a magnet and non-magnetic impurities using integrated gravimetric separation. "The dry method has the major advantage that impurities can be separated or sorted out much

more easily", explains Althöfer. "While the mill is turning, we carry out separation and the heavy particles simply fall down."

This is how it works in dry conditions, whereas, up to now, several process steps were required. In the paper industry, applied process modules for fibre recovery from waste paper, such as pulpers, cleaners, deflakers and refiners could be replaced through the FRT method. In addition, new perspectives are arising in waste paper recycling, since, for example, cores, kraft paper and high-wet paper can be frayed, which could not be done so far for reuse.

According to Althöfer, the energy released in the process is recovered. Overall, up to 80 % less power is consumed. Since no fresh water is used, there is also no waste water. The particles obtained through single microfibre disassembly are also up to 200 times smaller than the previous highest shredding stage 5 standardised for document destruction (DIN 32757).

"The massive environmental relief potential of the FRT method lies in its high energy saving, one hundred per cent fresh water savings and waste water prevention through dry fibre material recovery from waste paper", explains Althöfer in brief. Bales pressed from FRT fibres with the same measurements weigh 30 to 50 % more than conventional waste paper bales. This also entails a correspondingly higher utilisation of the loading capacity of lorries and container ships with other significant environmental benefits. "In view of an amount of waste paper of 300 million tonnes, which annually circulates worldwide and is processed into various paper products,

Bales pressed from FRT fibres

a considerable CO_2 discharge potential results from the application of the FRT method", adds Althöfer. Depending on the quality of the used fibre-containing raw materials, savings from 50 to 90 % could be achieved.

The first FRT systems could process up to 30,000 t/y of waste paper and cost approximately EUR 500,000 without sorting. Recently, a new, further developed model was presented, with a capacity that amounts to 150,000 t/y. This order of magnitude should already be interesting for an average paper mill, especially since, according to Althöfer, the quality of the fibres thus obtained has significantly improved: the separation of fillers achieved using the FRT method increases the quality and strength of newly produced paper. **S. Haase** ■