

Study shows benefits of recycling paper sacks

Paris/Stockholm, 09 April 2024. The 4evergreen alliance sets out to increase the recycling rate of fibre-based packaging to 90% by 2030¹. Accessing industrial packaging such as paper sacks as new fibre source can be part of the solution. The European sack kraft paper and paper sack industry commissioned independent research in the recyclability of paper sacks. The study² concludes that not only are used and unused paper sacks perfectly recyclable. They also offer product and process benefits when incorporated into the recovered fibre furnish. A [white paper](#) presents the outcome in detail.

Paper sacks are a widely used fibre-based packaging for industrial and consumer sectors. About 5.3 billion paper sacks have been placed on the European market in 2023. Like household and on-the-go packaging, they sometimes contain polymer coatings and free films to add functionality. “These additional materials as well as possible product residues have contributed to engrained perceptions that paper sacks are not compatible with standard recycling processes,” explains Catherine Plitzko-Kerninon, General Delegate of EUROSAC, the European Federation of Multiwall Paper Sack Manufacturers. “However, it lacked a systematic analysis if this reflects reality. As recovering fibres from paper sacks can save natural and economic resources and reduce CO₂ emissions, we decided to have this investigated.”



Recyclers can profit from recovering fibres from paper sacks.

Study setup

The research included five kraft paper sack variants, which are representative of over 80% of kraft paper sacks placed on the European market. Tested were previously unused typical sacks for cement and building materials, flour, milk powder, animal feed and pet food. In addition, the recyclability of an emptied cement sack was analysed to understand the impacts on fibre dispersion and paper sheet quality from any product residues. The testing was conducted according to the harmonised European laboratory test method by Cepi³. It provides results

¹ <https://4evergreenforum.eu/>

² M. Kay, M. Sturges, R. Langley, Investigating the papermaking potential from recycling kraft paper sacks within standard high volume paper mills. In Paper Technology International, PITA, Vol. 64, No. 3, Autumn 2023.

³ Cepi, Harmonised European laboratory test method to produce parameters enabling the assessment of the recycling of paper and board products in standard paper and board recycling mills, December 2020



relevant to standard recycling mill process efficiency (yield, coarse and fine rejects) as well as to recycled paper quality (visual impurities and sheet adhesion). This is translated into a recyclability score. For fibre-based packaging, the score needs to be between 0 and 100 to be classified “suitable for standard mill recycling”.

Are paper sacks recyclable?

The test results show that four out of the five samples of unused paper sacks obtain excellent recyclability scores ranged from 63 to 96. The highest yield score can be classified as “Best in Class”. This means it is unlikely that it poses repulpability issues in a standard recycling mill. Only the milk powder sack was recorded to create “major repulpability issues” due to a thick inner plastic tube. However, the tube is usually separated from the paper sack during its use. The used and emptied paper cement sack attained a recyclability score of 83. Any remains did not impact fibre dispersion or sheet quality. The test results identified that the less plastic content, the better the recyclability score. “This aligns with the recommendations proposed in our [Paper Sacks - Design for Recyclability Guidelines](#),” states Plitzko-Kerninon.

Sack kraft fibre enhances recycled paper quality

Further investigation was done to evaluate the potential from including sack kraft fibres in a typical recycled fibre mix. Sack kraft paper was repulped with 100 gsm testliner at various mixes. The pulp was used to prepare paper hand sheets from which different properties were measured, among them fibre length, optical coarseness, pulp drainage rate, dissolved and colloidal substances <10 µm as well as ash and paper sheet mechanical properties. The results show a linear improvement of the paper quality with increasing percentages of sack kraft fibre in the fibre furnish. Some examples:

- By just including 5% sack kraft fibre, the tear index of the recycled paper increased by 15.5%, the burst index by 2%, and pulp drainage improved by 7.1%.
- With 20% sack kraft fibre, the increase for the tear index is 44.4%, for the burst index 45.1%. Pulp drainage improved by 12.5% and the ash content was reduced by 5.5%.

Why recycling paper sacks makes sense

From the research, it can be concluded that used and unused paper sacks are perfectly recyclable. In addition, recyclers can improve the quality and the strength of the produced paper when including sack kraft fibres in the fibre furnish. A lower ash content implies a higher fibre yield, and the quicker pulp drainage makes it easier to form and dry the paper on the machine. This potentially reduces energy consumption and carbon emissions. “These results





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are, of course, lab-based,” says Plitzko-Kerninon. “In the next step, we plan to run more extensive trials and promote collection circuits to pave the way further for the recycling of paper sacks on a large scale.”

The study is published in a [white paper](#).

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Note to editors:

EUROSAC is the European Federation of Multiwall Paper Sack Manufacturers. The federation represents over 80% of European paper sack manufacturers. Its members operate in 20 different countries. They produce some 5 billion paper sacks per year, representing 630,000 tonnes of paper converted in 55 plants. Sack manufacturers from all continents and bag manufacturers also contribute to the federation as corresponding members, and more than 30 suppliers (paper, film, machine or glue manufacturers) are registered as associate members. www.eurosac.org

CEPI Eurokraft is the European Association for Producers of Sack Kraft Paper for the Paper Sack Industry and Kraft Paper for the Packaging Industry. It has ten member companies representing a volume of 3 million tonnes of paper produced in eleven countries. www.cepi-eurokraft.org