CEPI EUROKRAFT

Comparative study highlights benefits of paper sacks over WPP alternatives

1 Paper sacks show a superior performance compared to WPP sacks

For producers of cement and building materials, efficiency, sustainability, and worker health and safety are key to operational success and brand reputation. Packaging plays a crucial role in all three areas. To assess performance, CEPI Eurokraft commissioned lab tests comparing paper and woven polypropylene (WPP) cement sacks – focusing on filling speed, product loss, dust emissions and carbon footprint. The results were clear: paper sacks outperformed WPP sacks across the board. Paper sacks can be filled 21% faster, reduce product loss by a factor of four, generate only a third of the dust, and generate only half the carbon footprint in comparison with WPP sacks.

"Packaging may be just one element in the supply chain, but it's one that touches product quality, environmental performance and even worker safety," says Elin Gordon, Secretary General of CEPI Eurokraft. "These studies make a compelling case for paper sacks as the more effective and sustainable solution."

Paper sacks fill 21% faster

To compare the filling speed of 50 kg cement in high porous paper sacks and WPP sacks, a lab test was conducted using flush-cut valve sacks of both types. Paper sacks filled 21% faster than their WPP counterparts under identical conditions. On average, the paper sacks reached full capacity in 9.6 seconds, compared to 12.2 seconds for WPP sacks. Beyond faster filling speeds, paper sacks offer additional operational benefits. Unlike WPP sacks, they require no complex or costly air extraction systems to maintain performance thanks to their natural porosity. Filling machinery is also easier and quicker to set up and maintain, reducing operational costs.

WPP sacks lose four times more cement

A second test investigated cement losses during filling and from drop tests that simulated typical supply chain handling and transport. For the latter, both 50 kg cement sacks were dropped five times from 90 cm. WPP sacks lost an average of 9.55 grams of cement – four times more than paper sacks (2.44 g/sack). The WPP sacks showed leakage across their entire surface, contributing to contamination throughout the supply chain. Higher product loss also increases machine maintenance, downtime for cleaning, and potential health and safety risks for workers. "Scaled to industrial levels, these differences can translate into substantial savings," says Elin Gordon. "And they can contribute to a meaningful environmental benefit in this high-impact industry."

Switching to paper sacks could prevent 128 t of cement loss – and cut CO_2 emissions by 104 t per million tonnes packed.

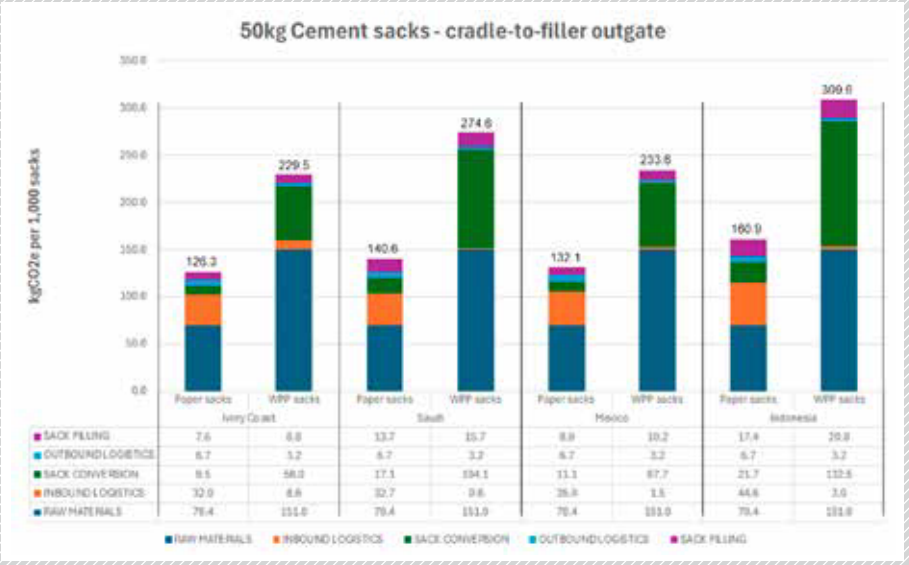
Two to three times fewer dust emissions from paper sacks

Cement dust contains hazardous minerals like chromium and silica. Exposure to it can pose serious health risks. To assess the role of sack types in workers' wellbeing, another lab test compared dust emissions during the filling of 50 kg cement in the two packaging alternatives. The test was carried out with oversight from the Austrian Dust Control Centre (ÖSBS). It measured particulate matter (PM) emissions, focusing on PM10 (under 10 µm) and PM2.5 (under 2.5 µm) particles. PM10 particles can irritate the skin, eyes, nose, and throat – affecting both the skin and the upper respiratory tract. PM2.5 particles can penetrate deep into the lungs and trigger coughing, asthma, and lung inflammation. The outcome revealed that WPP sacks generate significantly more dust – three times more PM10 and twice as much PM2.5 – than paper sacks. "Studies even find more depression, anxiety and a higher stress level in people who are exposed heavily to cement dust," explains Dr Heinz Fuchsig, Occupational and Environmental Health Expert. "Therefore, reducing dust is a benefit for workers and companies." The superior performance of the paper sacks is due to the natural porosity of paper, which allows the air to escape while retaining fine cement particles inside.

Two times higher CO_2 emissions from WPP sacks

Besides CO_2 emissions that can be attributed to cement losses, CEPI Eurokraft commissioned the research institute RISE to conduct a comparative peer-reviewed carbon footprint study of 50 kg paper cement sacks and WPP cement sacks to achieve knowledge of the fossil-based global warming potential in four markets outside Europe,

represented by the following countries: Ivory Coast (Africa), Saudi Arabia (Middle East), Mexico (South/Central America), and Indonesia (Southeast Asia). The measurement included emissions from raw material extraction to the point when sacks are filled and ready for dispatch. Across all markets, the total fossil-based global warming potential is approximately twice as high for WPP sacks compared to paper sacks when packaging 50 kg of cement, even though paper sacks carry a greater transport impact due to their weight and longer supply chains. The higher impact of WPP sacks is largely due to the energy-intensive production of polypropylene granules and sack conversion, whereas paper sacks benefit from a less carbon-intensive manufacturing process. "From operational efficiency and product integrity to environmental impact and worker protection, paper sacks offer measurable advantages compared to WPP sacks, making them the smarter, more sustainable choice for packaging cement and building materials," Gordon concludes.



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2 Paper sacks generate half the carbon footprint in comparison to WPP sacks

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