

## Mechanical, Physical and Durability Properties of Cement Mortars Added with Recycled PP/PE-Based Food Packaging Waste Material

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**Abstract :** In Switzerland, only a fraction of plastic waste from food packaging is collected and recycled for further use in the food industry. Therefore, reusing these waste plastics for building applications can be an attractive alternative to disposal in order to reduce the problem of waste management and to make up for the depletion of raw materials needed for construction. In this study, experiments were conducted on the mechanical properties (compressive and flexural strength, elastic modulus), physical properties (density, workability, porosity, and water permeability) and durability (freeze/thaw resistance) of cementitious mortars with additions of recycled low-/high-density polyethylene (LDPE/HDPE)/ polypropylene (PP) regrind (addition of 5% and 10% by weight) and LDPE sheets (addition of 0.5% and 1.5% by weight) coming from food packaging. The results show that as the addition of plastic material increases, the density and mechanical properties of the mortars decrease compared to conventional ones. Porosity is similar in all the mixtures made, while the workability and the permeability are affected not only by the amount added but also by the shape of the plastic aggregate. Freeze/thaw resistance, on the other hand, is significantly higher in mortars with plastic aggregates than in traditional mortar. This feature may be interesting for the realization of outdoor mortars in cold environments.

**Keywords :** food packaging waste, durability properties, mechanical properties, mortar, recycled PE, recycled PP

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