

## **Recycled crosslinked PE as a filler for HDPE with end applications in the construction industry.**

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Today, the plastic recycling industry is mainly focused on the most commonly used thermoplastics, i.e. PE, PP, PS, PVC and PET. However, many smaller fractions do not yet have a market value or are considered non-recyclable. One of these streams is multilayer underfloor heating pipes. These pipes consist of cross-linked polyethylene (x-PE) layers, both inside and outside, and an aluminium (Al) or EVOH core. There are also two thin adhesive layers between outer layers and the core. These tubes provide excellent properties for the construction industry but are not easily recycled due to their multilayer composition and the use of x-PE, which cannot be easily remelted and therefore cannot be recycled with un-crosslinked PE. In this work, the x-PE has been separated from the aluminium and tie-layers, by means of delamination and was subsequently ground into a fine powder. The powder is compounded as a filler in various rates in a representative virgin HDPE grade to create a blend that can be used in new construction industry profiles, like pipes. Using x-PE powder as a filler could lead to reduced cost and environmental impact as less virgin material would be needed. The blend is evaluated on mechanical and thermal performance both cross linked and un crosslinked. Processing behaviour in both strip extrusion and injection moulding, for applications like pipe fittings is investigated. Finally the potential for the use of recycled x-PE powder as a filler in HDPE for selected applications like piping can be validated.