

Press release

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EU Project CIRCULAR FLOORING enables environmentally friendly recycling of post-consumer PVC floor coverings

Freising, Germany – End-of-life flexible PVC floor coverings potentially contain ‘legacy plasticizers’ which may no longer be used today for reasons of consumer protection and which in the meantime have been replaced in the EU by safer alternatives. State-of-the-art recycling of such flooring with recovery of PVC in virgin-like quality therefore requires a technically sophisticated separation of these ‘legacy plasticizers’. The new EU project CIRCULAR FLOORING will meet this challenge with the innovative plastics recycling process CreaSolv^{®1}, which is patented by the [Fraunhofer Institute for Process Engineering and Packaging IVV](#). The objective is to gently recycle end-of-life PVC floor coverings by dissolving and removing respective substances in order to achieve a high quality virgin-like PVC material that is processed into granules. These are ready for re-use in new floor covering products which are compliant with current EU legislation and meet consumer expectations regarding a circular economy. CIRCULAR FLOORING aims at introducing the CreaSolv[®] process for PVC recycling on a technical scale. CIRCULAR FLOORING started at the beginning of June 2019 and until May 2023 it will receive about 5.4 million Euros of EU funding from Horizon 2020, the European Framework Programme for Research and Innovation. The project will be implemented by eleven companies and research institutes from five European countries and is coordinated by the Fraunhofer IVV in Freising.

Plastics are indispensable materials with many advantages in their application. While 1.5 million tons of plastics were produced in 1950², global production has significantly increased throughout the last decades, reaching 348 million tonnes in 2017³. In line with increased production, more plastic waste is occurring which can be a valuable resource in a circular economy. While recycling rates are steadily increasing in the EU, according to Eurostat, the European Statistical Office, only 12% of recycled materials are redirected into the European economy today, pointing to a vast potential for new sustainable recycling technologies.

Since PVC flooring has a lifespan of up to 40 years, PVC floor coverings of older type may contain specific phthalate plasticizers such as DEHP no longer in use in new products. These plasticisers cannot be extracted with existing mechanical recycling processes, whereas CreaSolv[®] is a solvent-based technology that allows this separation and hence to keep valuable recyclables in the economy. Besides this, energy recovery is the only alternative option to dispose of these plasticisers, but therewith, large amounts of high-value resources are lost. As these specific phthalate plasticizers may influence human health, the EU declared them as substances of very high concern (SVHC) and restricted their use in new as well as in recycled products with the [REACH directive](#). Since 2015, DEHP is prohibited in the EU without specific authorization.

¹ CreaSolv[®] is a registered trademark of the CreaCycle GmbH, Grevenbroich.

² European Parliament: www.europarl.europa.eu/news/en/headlines/society/20181212STO21610/plastic-waste-and-recycling-in-the-eu-facts-and-figures

³ PlasticsEurope, Plastics – the Facts 2018:

www.plasticseurope.org/application/files/6315/4510/9658/Plastics_the_facts_2018_AF_web.pdf

Recycled flexible PVC in virgin-like quality

The CreaSolv® recycling process, developed by Fraunhofer IVV and CreaCycle GmbH, now offers the possibility to separate PVC from undesirable legacy plasticizers and therewith to recycle PVC for future production of floor coverings. The objective is that characteristics of recycled PVC hardly differ from virgin PVC. At the same time, the separated plasticizers will be transformed into uncritical, REACH-compliant plasticizers by chemical catalysation and thus will be prepared as a safe alternative for a circular product cycle.

The CreaSolv® technology for PVC has already been tested at laboratory scale and showed feasibility. The aim of the EUproject CIRCULAR FLOORING is to elaborate on the technical and commercial feasibility of this recycling process for PVC floor coverings at an industrial scale. Life cycle analysis will be applied to compare the impact of different technologies. “The CreaSolv® process will offer an exquisite, sustainable way of recycling that may help to recover primary resources and reduce waste. CIRCULAR FLOORING aims to develop a model recycling process for difficult-to-recycle composite materials and supports the EU with its goals of establishing a circular economy,” project coordinator Dr Martin Schlummer from Fraunhofer IVV says.

The EU has adopted a [package of measures](#) towards a transition to a circular economy already in 2015, to strengthen its competitiveness worldwide, to support sustainable economic growth and to create employment. Through these measures, the value of products and materials shall be pertained as long as possible and they shall return into the value chain again at the end of service life.

CreaSolv® - an effective plastics recycling process

The CreaSolv® process encompasses special CreaSolv® solvent formulations, that do not contain hazardous substances according to the REACH directive and are therefore of non-risk for users and the environment. The scientists developed a specific formulation of solvents for the recycling of PVC floor coverings, which extracts the plastic of outdated shredded PVC floor coverings and separates it from phthalate plasticizers such as DBP, DIBP, BBP and DEHP. These critical plasticizers are safely destroyed through a chemical reaction and transformed into uncritical REACH-compliant plasticizers. The recovered PVC is precipitated and dried. Through adding customized additives and stabilizers, reconditioned recycled PVC is created and ready for re-use. This process enables the recycling of PVC that is containing plasticizers that have been defined as critical for human health under the REACH directive in an environmentally friendly way.

About CIRCULAR FLOORING

The project, which is funded by the European Commission started in June 2019 and will receive about 5.4 million Euros of Horizon 2020, the European Framework Programme for Research and Innovation, until May 2023. Eleven companies and research institutes from Austria, Belgium, France, Germany and Greece are part of the project. CIRCULAR FLOORING is coordinated by the Fraunhofer Institute of Process Engineering and Packaging IVV in Freising, Germany. Other German project partners are the Bavarian Research Alliance GmbH, Thinkstep AG, Vinnolit GmbH & Co. KG and Lober GmbH & Co. Waste Disposal-KG and Arbeitsgemeinschaft PVC-Bodenbelag Recycling GbR (AgPR, engl. Working Group PVC Floor Covering Recycling GbR). Two partners are based in Belgium, the Catholic University of Leuven and the European Resilient Flooring Manufacturers' Institute (ERFMI). Further expertise is contributed by the National Technical University of Athens from Greece, the Institut National de l'Environnement Industriel et des Risques (engl. National Institute for Industrial Environment and Risks) from France and Chemson Polymer Additives AG from Austria.

About the Bavarian Research Alliance (BayFOR)

The [Bavarian Research Alliance](#) – funded by the Bavarian Ministry of Science and the Arts – supports and advises Bavarian scientists and stakeholders from the private sector in securing European funding for research, development and innovation. The focus is on the current Framework Programme for Research and Innovation [Horizon 2020](#) as well as the future [Horizon Europe](#) Framework Programme. As a partner in the [Enterprise Europe Network](#), BayFOR provides targeted advice and support for Bavarian companies (especially SMEs) interested in EU research and innovation projects. BayFOR is a partner institution in the [Bavarian Research and Innovation Agency](#).

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