

From old pants to new seats

New life for used textiles made from blended fibers

The mountains of old clothes are growing massively and are largely destroyed instead of being recycled and returned to the textile industry. Old textiles are a valuable raw material that can be easily reused. imat-uve is working with a German-Dutch project consortium on an industrial solution for the recycling of old clothes made of mixed fibres. The recycling yarns and woven fabrics are primarily intended for use in the automotive industry.

1.01 million tons of textiles, old clothes and new garments that have never been worn end up in the trash in Germany alone every year (source: BSVE). So far, there is no possibility to process these quantities of old textiles in a high-quality way. Most of the textiles are burned or processed to low quality nonwovens. The problem is the different components of the clothing, which in most cases are not made of pure but mixed fibers.

This is about to change now. The engineering and development service provider imat-uve is developing, together with a consortium of partner companies, a mechanical recycling process that recycles used textiles made of blended fibers for use in vehicle interiors. Previous recycling approaches usually follow chemical processes and therefore cannot be seen as wholly sustainable.

Mechanical recycling process without chemicals

By optimizing the recycling process, the blended fibers can be torn very finely and processed into a particularly soft, uniform card sliver by new spinning preparation technologies. This forms the best basis for spinning. The resulting high-quality yarns (Nm15 and Nm28) can be further processed for different requirements, depending on the blending of polyester. In the trials of the project, 12 yarn qualities in different mixing ratios have been spun in the meantime. All approaches to spinning, both in the pilot plant and on industrial spinning machines, led to very good results. The raw material for the production of the yarns consists of sorted used workwear (made of 60 percent polyester and 40 percent cotton) and old clothes (made of unknown fiber blends) as well as raw polyester.

Fabrics for highest demands

From the resulting recycling yarns, imat-uve created various fabric samples. The weaving process shows an excellent result. Even yarn made of 100 percent mixed fibers could be

woven industrially without complications. There were no thread breaks and hardly any fiber abrasion during weaving. In tests with previous yarn and weaving versions, standard tests for the automotive industry, where high demands are placed on the durability and comfort of the textiles, have already been passed very well. For example, the Martindale test was used to certify a resilience of at least 50,000 tours in terms of abrasion behavior. The modified Martindale tests for internal and external pilling and hot-light aging also produced good results. The prognosis for the current fabrics suggests even more promising test results in the next test series. The project partners are eagerly awaiting further weaving trials in late summer 2020, in which yarns made of 100 percent blended fibers are processed not only as weft but also as warp threads. A yarn spun with open-end technology in a gauge of Nm28/2 will be used as a warpable variant in the next series of tests.

Mixed fiber recycling is also of interest for sophisticated designs. The natural mixing of materials and colors in the raw material results in attractive colorations of the yarn and fabric. Special color compositions are also possible through targeted pre-sorting of the old clothes.

Push for the textile industry in the border region Germany - Netherlands

Besides imat-uve, the project consortium consists of the partners C2C ExpoLab, FBBasic, Stichting Texperium and Trützschler. The project is supported by the European Union within the framework of the INTERREG Germany-Netherlands program and co-financed by the North Rhine-Westphalian Ministry of Economic Affairs (MWIDE NRW), the Dutch Ministry of Economic Affairs and Climate (EZK) and the provinces of Limburg and Overijssel.

The requirements of the automotive industry are regarded as the highest goals of the application, but the developed yarns are also to be made available to other sectors such as architecture, home textiles and clothing. In the sense of a circular economy with Cradle to Cradle (C2C) principles, the joint project aims to reduce the CO2 footprint of textiles and strengthen the textile industry in the Rhine-Meuse region. The process and product innovation is to be used to establish the textile industry in the border region between Germany and the Netherlands as an innovation leader in the field of mixed fiber recycling and textile recycling management.

About imat-uve

imat-uve is an innovative, independent development and engineering company that supports its customers from the idea to the finished product along the entire process chain. This includes project management, design and development as well as the testing of materials, components and systems. In this project, imat-uve takes over the project management, with the entire project planning (development and support of the design of experience / test plan) and coordination and control of the partner activities. imat has its own materials laboratory, in which the necessary development tests of the yarns and fabrics are carried out. imat's textile designers and engineers develop fabric samples that have to be produced by a weaving mill. This is where imat's existing textile and automotive industry network comes into effect. Furthermore, imat and C2C Expolab take over the communication and PR activities, such as the planning and implementation of trade fairs, workshops and publications. www.imat-uve.de

About Texperium

Texperium is an Open Innovation Centre for high quality textile recycling in the Netherlands, with an impact throughout Europe. The Open Innovation Center aims to ensure that textile recycling and the development of the recycling economy become "business as usual" and state of the art in the coming years. This objective will be strengthened by cooperation in the project "Transitagenda Konsum", which is part of "Nederland circulair in 2050". Texperium specialises in consultancy and innovation in the field of textiles and mechanical recycling. Texperium has state-of-the-art research facilities for companies and institutions to support the development of innovations in textile reproduction and the use of recycling materials in sustainable and profitable applications. The research facility bridges the gap between scientific research (small-scale, science-driven) and industrial development through experimental and pilot facilities on a semi-industrial scale. In this project, Texperium is responsible for technical yarn development. In cooperation with imat, the experimental design is drawn up and various fiber blends are developed into yarns. Texperium provides the technical competence in the field of recycled fibers as well as spinning processes, which are necessary for the high complexity of this project. www.texperium.eu

About C2C ExpoLAB

The C2C ExpoLAB specialises in the practical application of the Cradle to Cradle principle in the built environment and the political actions of public authorities. It helps clients such as public authorities and educational institutions as well as contractors, architects and construction companies. It also advises on the formulation of policy objectives, tenders and reconstruction projects, in order to make money and save money with the principles of the economic cycle in an innovative way by applying C2C principles to projects. The C2C ExpoLAB thus helps to create a healthy, better world and acts in the conviction that the application of the economic cycle and Cradle to Cradle also has a positive influence on the various business cases of companies. Sustainable solutions should be cleverly combined with each other and thus bring synergy advantages. With each new project the demand should increase even further and realize a significant added value for the customer and the users of the building or product. www.c2cexpolab.eu

About FBBasic

In order to maintain textile production in Europe and to return parts of it to Europe, locally available raw materials are necessary, but hardly any raw materials are available here. This is the basis for the principle "from Fossil Mining to Urban Mining". FBBasic and its subsidiary Cirmar work together with customers and partners according to this principle to create the transition from passive to active recycling. The core activity of FBBasic is consulting, especially in the areas of operational and IT processes. Without circular systems, such as return logistics and the corresponding IT systems for material identification and Track & Trace, circular products are not possible. FBBasic cooperates with many industries, a large part of which is workwear and safety clothing (including safety shoes and personal protective equipment). In recent years, circular products have been developed for and with several companies in this sector, but circular systems (such as return logistics, material passport and database as well as IT dashboard for positive impact) have also been set up. The projects carried out by FBBasic are predominantly international. In this project, FBBasic (in addition to the core topics of C2C ExpoLAB) advises the consortium in the processes of return logistics and the IT systems required for this, so that recycling can already be planned at the beginning of the design and development process of the yarns and products. This is the only way to create truly circular products. This input will also find its place in the planned workshops. In addition, FBBasic brings into the project a network developed over 20 years in the field of recycling management and the textile industry. www.fbbasic.com

About Trützschler

The Trützschler Group is a German textile machine manufacturer based in Mönchengladbach. The family business is divided into the Spinning, Nonwovens & Man-Made Fibers and Card Clothing divisions. Machines, systems and accessories for spinning preparation, the nonwovens industry and the man-made fiber industry are produced at eight locations worldwide. In addition to the four plants in Germany, these include production sites in China, India, the USA and Brazil as well as a development site in Switzerland. In the spinning business area (yarn spinning), the Trützschler Group is the technology and market leader in spinning preparation for the cotton and man-made fiber sectors. The high-tech textile machines support fiber preparation from the "blowroom" to the "carding machine" to the "draw frame". Only after these process steps have been completed can the so-called card sliver or draw frame sliver be fed to the spinning machines for yarn production. Spinning processes and yarn quality are significantly influenced and determined by this preliminary work. The technological challenge in this process is the spinning of very short fibres of different thicknesses resulting from tearing processes. The fibre preparation of recycled mixed fibres results in a very inhomogeneous fibre mass, which is why this process step is of great importance in the project. Trützschler will support the consortium in this challenge with know-how so that the optimal process sequences and parameters can be defined. In addition, Trützschler will provide machine capacities for running test series in its in-house pilot plant. Due to the concise and established market position in the textile industry of the region and worldwide, Trützschler also brings a large network of fiber preparation and processing as well as the spinning mill into the project. The Trützschler Group supports the project at its own expense and does not register any eligible costs with Interreg. www.truetzschler.de

Media contact:

imat-uve gmbh

Nicola Sengpiel-Bender

Monforts Quartier 31, Schwalmstr. 301

41238 Mönchengladbach / Germany

Phone +49-2161-6865879 // Email: nicola.sengpiel-bender@imat-uve.de

Digital images are available upon request.

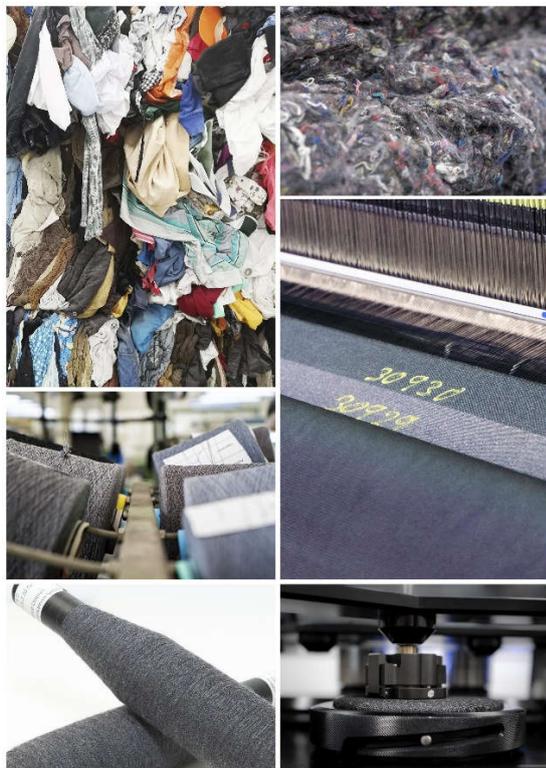


Image1 : The mechanical recycling process enables the re-use of blended fibers from old clothes, in form of high-quality yarns. (Credits: imat-uve)