

# FAQs



## VAUDE products made from recycled materials.

**In order to make a contribution to the fight against climate change and comply with the Paris Climate Agreement's 1.5-degree target, we at VAUDE have set ourselves the goal of manufacturing our products predominantly from biobased or recycled materials by 2024. When it comes to recycling, there are a variety of processes that can be used to recover materials. We would like to answer our most frequently asked questions in detail here.**

### **Why does VAUDE rely on recycled materials?**

Recycling helps to conserve the planet's valuable resources. Raw materials with a finite supply – such as plastics made from petroleum – can be kept in the utilization cycle for longer periods of time thanks to recycling processes. Instead of simply disposing of products at the end of their lifespan or destroying them in waste incineration plants, for example, they should be recycled. This can conserve energy, reduce the greenhouse effect and minimize the waste of fossil raw resources. The circular economy is an important step towards a more climate-friendly and low-emission future and we want to actively contribute to its success by using as many recycled materials as possible in the manufacturing of our outdoor products. A distinction is made between mechanical and chemical methods for recycling plastics.

### **What is mechanical recycling and what are the limits of the process?**

In mechanical recycling, materials are shredded, cleaned and the plastic granulate is then remelted to produce secondary raw materials. In contrast to chemical recycling, neither the composition of the plastic nor its molecular structure is significantly changed. \* Colors from the source material, for example, cannot be filtered out in the process. In order to achieve high quality secondary materials in mechanical recycling, it is important to use plastics that are single type and as color-separated and clean as possible.

### **Why are recycled materials blended with non-recycled materials in VAUDE products?**

“Downcycling” is the only option for lower quality original materials. Mechanically recycled secondary materials may then have a lower quality and functionality than the original material. In order to achieve the desired high quality and functionality in our products despite this issue, we blend recycled and non-recycled materials in a variety of proportions in certain cases.

### **What does VAUDE use mechanical recycling for?**

In mechanical recycling, packaging waste (such as that from PET beverage bottles, for example) is recycled and processed into polyester fiber, which can then be used in many different ways. We turn it into insulation that we use as a thermal fill for jackets or sleeping bags, or we use recycled polyester to make new items of clothing such as T-shirts, jackets or pants. Fabrics for the production of backpacks and bags or webbing straps are also made from recycled polyester. We are working closely with companies that are developing innovative recycling technologies to return a wide variety of waste products into the cycle. We use sorted industrial waste such as multi-layer polyamide films to produce attachment hooks for our wheel bags. Recycled packaging made of polypropylene (PP) (such as yogurt or detergent containers collected from Germany's Yellow Bag Recycling Program) are used in the production of back panels for our bike bags. In this process, a very robust, inherently stable and UV-resistant material was developed especially for VAUDE that contains a recycled content of 65%. According to a study by the Fraunhofer



Institute, the use of the recycled material reduces greenhouse gas emissions by 56% compared to the use of virgin materials.

### **What is chemical recycling?**

When it comes to chemical recycling, there are several technologies in use for different plastics. A distinction is made primarily between solvent-based, thermochemical and enzyme-based recycling processes. The difference between chemical and mechanical recycling is that the molecular structure of the polymers and the composition of a plastic is changed. \* Put simply, in the various chemical recycling technologies, the material is broken down into its molecules – the basic chemical building blocks.

### **What advantages does chemical recycling have and what is it used for at VAUDE?**

The biggest advantage of chemical recycling is that it can be used to achieve a very high quality product. The secondary material obtained has the same high-quality properties as its non-recycled counterpart. In addition, chemical processes can be used to recycle materials that cannot be recycled mechanically. Recycled items include used carpets, fishing nets, tires, mixed plastics and clothing. The recycled granules obtained from these materials have a consistently high quality and functionality. The advantage of chemical recycling is that it allows for many successions of reprocessing leading to a closed-loop system. The higher quality of the recycled end product material naturally also has an effect on the durability of the products made from them, contributing to a longer usage phase with a smaller ecological footprint overall. Another advantage over mechanical recycling is that impurities and pollutants can be removed from the source material.

### **Chemical recycling requires a high amount of energy. Does the process really contribute to fighting climate change?**

Chemical recycling requires more energy than mechanical recycling. Generally speaking, however, it requires less than that needed for the production of new materials. The energy balance can be further improved by increasing the use of renewable energy from solar, hydro or wind power. This is why we see phasing out the use of fossil fuels as a way to speed up the energy transformation, leading to a successful circular economy. In addition, these processes have the capacity to become more efficient which will lead to even lower energy consumption. We recognize a high potential for greater climate protection in chemical recycling and are counting on the rapid development of the method.

### **How does the chemical recycling of tires work and what advantages does the process offer?**

VAUDE is the first company to offer high-performance outdoor pants made from tires that have been recycled using an energy self-sufficient thermochemical pyrolysis process. During pyrolysis, substances are broken down into their molecules at high temperatures in the absence of oxygen. The advantage of recycling tires is that a collection system with high availability is already in place and neither sorting nor extensive cleaning is necessary. This keeps the energy expenditure in the preparation of the recycling process low. We use pyrolysis oil obtained from recycled tires as a substitute for fossil oil in the production of synthetic fibers such as polyamide. In a certified mass balance process, the recycled oil is fed into the polyamide production system. This technology saves about 60% in CO<sub>2</sub> emissions\*\* during production compared to extraction from fossil oil and conserves scarce resources making a valuable contribution to climate protection. The recycled polyamide has the same high-quality properties – it is just as elastic, fast-drying and high-performance as conventional polyamide. This, in turn, has the advantage that the yarn can be further processed into textiles of equal quality and that existing equipment can be used for this purpose. It therefore requires no special treatment in downstream processes, as is often the case with biobased materials, for example.

### **Are the CO<sub>2</sub> savings of approx. 60% for recycled tires realistic?**

Savings in CO<sub>2</sub> emissions are often quoted as a percentage for recycled materials. These savings are calculated using a Life Cycle Assessment (LCA). For this purpose, the environmental impact of a material



is considered over its entire life cycle, from raw material production to the finished material. We use a material from BASF that according to its LCA\*\*, has a CO2 savings of approx. 60% compared to crude oil. Its production was carried out in accordance with the ISO 14040/44 standard and verified by independent experts. From our point of view, the offset of waste incineration is permissible as there are currently no good alternative options for used tires.

### **How high is the percentage of recycled used tires in the final VAUDE product?**

The pyrolysis oil extracted from one tire is approximately equivalent to the amount of oil required for the fabric production of five pairs of high-performance pants. (This doesn't mean, however, that the fabric for a pair of pants is made 100% from tires.) The certified mass balance process used for recycled tires ensures that the input of pyrolysis oil from tires that is fed into the polyamide production system is transparently presented and documented. In this process, the percentage of recycled raw materials is allocated proportionally to the end product. Similar to the use of green electricity, the aim is to continuously increase the actual output in polyamide production. As many manufacturers as possible should therefore purchase recycled content, thereby ensuring that the total percentage in polyamide production increases.

### **Our conclusion:**

Recycling processes are making an important future-oriented contribution to climate-friendly textile production and the circular economy. Depending on the final use of the product, we rely on both mechanical recycling and innovative new developments in the field of chemical recycling processes. We have made a conscious decision to use polyamide from recycled tires with mass balancing and expect to increase our use of materials from chemical recycling in the future – when mechanical recycling reaches its limits in terms of availability and quality of the raw materials obtained. Like the shift from fossil fuels in the automotive sector to greater electro-mobility with its use of hydrogen as an energy carrier, there are no simple black and white solutions. We want to curb climate change and are pursuing the goal of gradually reducing our carbon footprint. In doing so, we are delighted to be a pioneer along the way. Our products made from recycled materials are climate-friendly, highly functional and, at the same time, helping to solve major waste problems.

Sources:

\* <https://renewable-carbon-initiative.com/renewable-carbon/glossary/>

\*\* Chemcycling, Environmental Evaluation by Life Cycle Assessment, BASF, November 2020 GaBi version 9.2 (2020), Sphera AG, Polyamide 6 Granules