

## About Henkel

Henkel operates globally with a well-balanced and diversified portfolio. The company holds leading positions with its three business units in both industrial and consumer businesses thanks to strong brands, innovations and technologies. Henkel Adhesive Technologies is the global leader in the adhesives market – across all industry segments worldwide. In its Laundry & Home Care and Beauty Care (now Consumer Brands) businesses, Henkel holds leading positions in many markets and categories around the world. Founded in 1876, Henkel looks back on more than 140 years of success. In 2021, Henkel reported sales of more than 20 billion euros and an adjusted operating profit of about 2.7 billion euros. The company employs more than 52,000 people globally – a passionate and highly diverse team, united by a strong company culture, a common purpose, and shared values. As a recognized leader in sustainability, Henkel holds top positions in many international indices and rankings. Henkel's preferred shares are listed in the German stock index DAX. For more information, please visit [www.henkel.com](http://www.henkel.com).

## Transformation to renewable carbon – a Henkel Adhesive Technologies perspective

At Henkel AG & Co. KGaA, we support the transition from fossil to renewable carbon-based raw materials for our products. To decouple chemistry from fossil carbon, renewable sources must be found that do not lead to additional CO<sub>2</sub> emissions and hence establish a circular carbon technology. Henkel is committed to become climate positive in own operations by 2030. Furthermore, considering 2017 as base year, Henkel intends to reduce the carbon footprint of all raw materials by 30% till 2030. Sustainable innovation is one important driver behind our ongoing research and development efforts – using novel bio-based materials not only helps to reduce our carbon footprint but at the same time naturally derived structures can improve product performance by introducing additional chemical functionalities & interactions. At Henkel Adhesive Technologies, we value the research and development for bio-based raw materials. We have a dedicated R&D team to develop new bio-based materials and adhesives. This effort has resulted in a range of newly launched adhesive products over the recent years. However, there is still a way to go to launch more renewable carbon based products and we are constantly striving for improvements.

This presentation shall highlight our current R&D activities around renewable carbon-based raw materials and technologies for adhesives. We would like to present our current status in projects like PEference, ZABIO and BIOVIN as well as our R&D direction in the field.

PEference: Furandicarboxylic acid (FDCA) is a new, interesting building block that can only be produced from biomass in an economically viable way. The first technical assessments of FDCA in polyesters revealed intriguing properties that led to a new generation of adhesives with different performance (added value) compared to the current adhesive products in Henkel's portfolio. As such, the FDCA building block is not just a replacement, but actually also creates better product properties on top of its sustainability benefits. Renewable carbon based building blocks like FDCA are strongly needed to create a renewable carbon based raw material toolbox for the CASE (Coatings, Adhesives, Sealants and Elastomers) markets and will help companies, society and EU to fight against climate change and become independent from fossil resources.

BIOVIN: Vinyl ethers are especially interesting monomers for UV-curable adhesives. In the frame of this project a novel catalytic system was developed for the preparation of bio-based (bis) vinyl ethers. The latter are used for the first time as monomers and for the preparation of prepolymers that can be used as integral part for new adhesive formulations.

ZABIO: Zosteric acid is a promising building block that can be manufactured via fermentation of sugar. This non-toxic material is investigated in coating and sealant formulations as additive for its antifouling properties.