

# Chemical Recycling Position

Henkel Corporate Sustainability



## Contents

1. Executive Summary .....	3
2. Background.....	3
2.1 The Role of Recycling in Achieving a Circular Economy .....	3
2.2 Chemical Recycling: Technologies and Potential .....	4
3. Henkel Position .....	6
3.1. Commitment to Circularity and Sustainable Packaging.....	6
3.2 Position on Chemical Recycling and Environmental Responsibility .....	6
4. Call for Action .....	7
4.1. Legal Environment.....	7
4.2. Technology and Material Neutrality.....	7
4.3. Transparent Life Cycle Analysis .....	8
4.4. Creating a Level Playing Field Through Value Chain Collaboration .....	8
5. Key Takeaways.....	8

# 1. Executive Summary

Henkel is deeply committed to sustainability—and the transition to a circular economy is a key element of our company’s approach to this commitment. In a circular economy, all materials re-enter the economic model via reuse or recycling and waste is minimized or eliminated. Those reused or recycled raw materials (also called secondary raw materials) have high relevance for Henkel. We aim to use those materials in our product formulas and packaging.

To promote the transition to circularity, we work together with suppliers, partners, customers and stakeholders worldwide. Our approach explores all possible methods and technologies that convert waste materials into recycled feedstocks. We consider the full life cycle and the holistic environmental impact of each technology and output material.

Chemical recycling is one of the methods that our experts take into consideration.

This position paper outlines Henkel’s approach to exploring how chemical recycling can contribute to a circular economy. It provides relevant context, while also clearly stating our stance related to advocacy for chemical recycling. The paper aims to support colleagues across departments at Henkel with making responsible and sustainable decisions about the materials we purchase and include in our product formulas or packaging. The paper is relevant to Henkel worldwide—in all business units, industries, markets and product categories.

## 2. Background

### 2.1 The Role of Recycling in Achieving a Circular Economy

It will only be possible to achieve a circular economy if certain essential framework conditions are in place. This includes integrated waste management systems with infrastructure for collection, sorting and recycling. It is also necessary to establish demand for secondary raw materials and clear criteria for the quality of those materials. A mindset shift is also required: Organizations and individuals must embrace value-chain thinking and recycling must become sourcing, shifting value from the end to the beginning of the packaging and chemical industry value chain. These conditions will enable true circularity by supporting efforts to implement sustainable technologies and business models.

Recycling is at the heart of the push for circularity. Various models of recycling are available.

**Mechanical recycling** generates secondary raw materials from waste by physically grinding, melting or reprocessing it—without altering its chemical structure. This approach is capable of recovering significant volumes of material, especially if products are created in line with

“Design for Recycling” guidelines and if appropriate systems for collection and sorting are in place. However, there are some challenges related to this recycling method:

- The quality of the input waste materials directly affects the quality of the output materials.
- Some materials, like plastic, degrade with each cycle of mechanical recycling. Degradation includes weakened mechanical properties or an unpleasant odor. This can require the addition of extra virgin-like materials to ensure quality.
- Safety requirements limit or even forbid the use of mechanically recycled materials in certain applications (e.g. food or cosmetics packaging).
- Regulations limit or even forbid the use of mechanically recycled materials for packaging of dangerous goods (e.g. flammable chemicals).
- Increasing legal requirements and regulations (such as quotas for the use of recycled material) are driving up demand for mechanically recycled materials. Consequently, there is a lack of available material.

Other forms of recycling offer potential to overcome these challenges by processing materials that are outside the scope of what is possible for mechanical recycling. This includes **chemical recycling** and **solvent-based recycling**.

## 2.2 Chemical Recycling<sup>1</sup>: Technologies and Potential

**Chemical recycling** involves breaking down waste from polymer material into chemical building blocks that can be reused to produce new materials and input materials. It can complement mechanical recycling by processing forms of waste that cannot be processed effectively by mechanical recycling. In this way, it can enable recycling of waste that is otherwise non-recyclable.

Methods of chemical recycling include:

- **Depolymerization:** This process breaks polymers down into monomers through reactions such as metanalysis, glycolysis or hydrolysis. It is especially suited for polycondensation of polymers like PET plastic. Each depolymerization method varies in terms of energy consumption and the efficiency for generating high-quality output materials.
- **Pyrolysis:** This involves a thermochemical process that heats polyolefin-rich plastic waste in the absence of oxygen and converts it into pyrolysis oil. The oil can be used with or without pretreatment for the steam cracking process, as a substitute for fossil-based naphtha. In this way, it supports production of base chemicals, polymer precursors and fuel.
- **Gasification:** This chemical recycling technology converts carbon-based materials such as plastic waste or biomass into a synthetic gas (syngas) that is primarily composed of hydrogen, carbon monoxide and carbon dioxide. The process occurs at high

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<sup>1</sup> involves processes that break down (plastic) waste into chemical building blocks, which can be reused to make new materials and chemicals.

temperatures (typically above 700°C) in a low-oxygen or oxygen-starved environment that prevents full combustion.

**Solvent-based recycling** must be differentiated from chemical recycling—although it does involve using chemical solvents to dissolve plastics and separate contaminants as well as additives. However, it is true that this recycling method can result in recycled materials that offer higher levels of quality than comparable materials generated via mechanical recycling.

Typically, solvent-based recycling and chemical recycling via depolymerization demonstrate advantages in terms of their environmental impact when compared to chemical recycling via pyrolysis or gasification. In some cases, chemical recycling via pyrolysis can have a lower impact on climate change than producing equivalent virgin materials, particularly if incineration avoidance is considered in the calculation.<sup>2</sup> In such comparisons, only the material use of recycled material is considered recycling. Use for fuel or energy production is considered recovery, instead of recycling. This distinction is in line with the EU Waste Framework Directive.

Overall, chemical recycling serves as a complementary solution alongside mechanical recycling because it enables the recycling of heterogeneous, contaminated or multilayer plastic waste streams that fall outside the technical scope of mechanical recycling methods. Therefore, chemical recycling can help to promote the transition to a circular economy for post-use plastics that currently get incinerated or enter landfills, particularly where no viable mechanical or alternative recycling pathways exist. In addition, chemical recycling facilitates the recovery of polymer building blocks while preserving critical material properties that are required for certain applications. However, purity requirements apply for output materials from all methods of recycling.

By combining the strengths of mechanical and chemical recycling—and by creating the necessary economic, technological and regulatory conditions—it is possible to leverage the full potential of recycling systems and make waste a valuable resource. In situations where segregated processing of material is not yet feasible, **chain-of-custody models** like the **Mass Balance approach** can be used. These models track the use of alternative feedstocks at the beginning of the production process and allocate them to final products, enabling an industrial transition toward circularity.

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<sup>2</sup> [Life cycle environmental impacts of chemical recycling via pyrolysis of mixed plastic waste in comparison with mechanical recycling and energy recovery - ScienceDirect](#)

## 3. Henkel Position

### 3.1. Commitment to Circularity and Sustainable Packaging

Henkel has clearly demonstrated its commitment to circularity by participating in key initiatives such as the European Commission's voluntary pledging exercise<sup>3</sup> and the US Plastics Pact.<sup>4</sup> Through collaborations across the value chain—including the Global Plastics Commitment by the Ellen MacArthur Foundation<sup>5</sup> and the Consumer Goods Forum's Golden Design Rules<sup>6</sup>—the company aims to make products and packaging more sustainable, increase the use of recycled raw materials and help address global plastic waste challenges.

To achieve a circular economy, **mechanical recycling** remains the priority approach. However, **chemical recycling** can complement this approach whenever mechanical recycling is not feasible. It is important that chemically recycled materials should be considered sustainable if they prove environmental advantages like improved carbon footprint vs. virgin material or increased volumes of material becoming viable for recycling.

### 3.2 Position on Chemical Recycling and Environmental Responsibility

Henkel accepts chemically recycled feedstocks as complementary to mechanically recycled materials, particularly for waste streams that are hard to recycle. However, chemical recycling must be conducted under verified, ethical, safe and environmentally sound conditions. Clear and transparent Life Cycle Assessments (LCAs) must indicate energy consumption and the overall environmental impact. Selection of recycling methods should be based on carbon footprint to avoid trade-offs between targets for circularity and emissions reduction. In cases where segregated production of recycled content is not yet feasible and where chain-of-custody models (e.g. Mass Balance methods) are used, Henkel requirements as outlined in the Mass Balance Position serve as a guideline.

Henkel does not support the use of chemical recycling for fuel production, but we believe further de-carbonization of the chemical industry will require recognition of renewable carbon-based feedstocks as a key enabler.

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<sup>3</sup> [Circular Plastics Alliance - European Commission](#)

<sup>4</sup> [U.S. Plastics Pact | Working together to end plastic waste](#)

<sup>5</sup> EMF : <https://www.henkel.be/fr/presse-et-medias/communiqués-de-presse/2018-10-29-henkel-signed-commitment-to-drive-progress-toward-a-circular-economy-for-plastic-886096>

<sup>6</sup> Consumer Goods Forum: [Packaging Design](#)

## 4. Call for Action

### 4.1. Legal Environment

Henkel calls on policymakers to promote technological progress that improves collection and recycling rates of packaging and products. Design improvements and substantial technological progress are needed to tackle challenges in collection, sorting and recycling technologies. Mechanical recycling plays an important role in the transition toward a circular economy and should remain the first choice for recycling waste. For this reason, policymakers need to ensure the continuous development of mechanical recycling. Design-for-recycling rules within regulations should support mechanical recycling. Chemical recycling can complement mechanical recycling and help to meet the technical requirements of certain material and packaging types, when mechanical recycling cannot process those materials.

Henkel also encourages regulators to provide a harmonized, transparent and science-based framework for determining End-of-Waste (EoW) status within chemical recycling processes. In addition, we call on policymakers to clarify the interface between waste and product regulations. These determinations should be technology-neutral and based on verifiable quality and safety criteria. Without this clarity (to eliminate national discrepancies about the point at which EoW status is reached in the chemical recycling process), advanced recycling technologies and circular feedstocks will face unnecessary legal and market barriers.

Moreover, Henkel supports a political framework that diverts plastic waste streams away from landfilling, export or incineration and toward recycling processes—while also preventing plastics and microplastics from polluting the environment.

Henkel supports Packaging Recovery Organizations (PROs) providing financial contributions and with improving the compatibility of its products with collection and sorting infrastructure. This includes boosting the recyclability of Henkel products (e.g. label adhesives or coatings that are used in the packaging industry) and product packaging. In the context of Extended Producer Responsibility (EPR) eco-modulation, Henkel calls on PROs to provide a bonus for the use of recycled material. Materials from solvent-based recycling and chemical recycling should also be considered, if their respective environmental advantages can be proven.

### 4.2. Technology and Material Neutrality

The principle of technology neutrality and material neutrality should be maintained regarding the design or recyclability of raw materials and packaging, as well as innovative technologies. Legal frameworks such as the Waste Framework Directive (WFD) in Europe should be adhered to. Henkel is also committed to taking a life-cycle approach that considers innovation and impact along the entire value chain. We strive to find the best available technology in terms of its performance and sustainability profile.

### 4.3. Transparent Life Cycle Analysis

Conducting transparent LCAs in line with accepted calculation principles like ISO 14044 or the Product Environmental Footprint (PEF) guidelines will help to identify and optimize the environmental impacts of chemical recycling. This emerging technology must prove to be environmentally beneficial in the long term when compared to the production of fossil-based ingredients or virgin plastics. These impacts should also be transparently communicated to all stakeholder groups.

Henkel's suppliers must provide the carbon footprint of any products that are derived from chemical recycling—including information about the calculation and allocation methods used. For calculation, cradle-to-gate boundaries should be applied, without credits for incineration avoidance. The carbon footprint calculation must be in line with the GHG Protocol accountability rules. Suppliers are also encouraged to provide full, peer-reviewed LCA results in which the CO<sub>2</sub> footprint and other environmental impacts of their chemical recycling technology show an improvement compared to virgin material production.

### 4.4. Creating a Level Playing Field Through Value Chain Collaboration

To unlock the full potential of solvent-based recycling or chemical recycling and ensure their meaningful contribution to global sustainability goals, the business case must be economically viable and sustainable over the long term. This requires creating a level playing field across the entire industry, where regulatory frameworks, incentives and standards support fair competition and innovation. Crucially, collaboration across the entire value chain - from material suppliers and technology providers through to brand owners and waste management - is essential to align interests, share risks and drive scalable solutions that accelerate the transition to a circular economy.

## 5. Key Takeaways

- 1)** Chemical recycling involves breaking down waste into chemical building blocks that can be reused to produce new materials or secondary raw materials.
- 2)** Chemical recycling offers potential to process challenging materials that are outside the scope of what is possible for mechanical recycling.
- 3)** Henkel accepts chemically recycled materials for its product formulas and packaging if they are processed via verified, ethical, safe and environmentally sound conditions.
- 4)** Henkel calls on policymakers to ensure a political framework that diverts waste streams toward recycling processes and supports the development of recycling infrastructure.
- 5)** Henkel calls on suppliers to provide transparent LCA data about chemically recycled materials and calls on partners across the value chain to collaborate for progress toward a circular economic model.