

Hot Melts Can Support Sustainability

Every day, Henkel strives to deliver adhesive and coating solutions that minimize long-term environmental impact. Some of our greener technology products are formulated using raw materials sourced from renewable resources. Others can be fully recycled or repulped.

Low or no-Volatile Organic Compounds (VOC) emissions levels are also an important factor we consider when creating new adhesive products, and hot melt adhesives are a good example of how a technology can minimize environmental impact. Made of solid pellets, these adhesives are not composed of solvents or water that can make products heavy to transport. Because they are lighter weight, not only do they use less transportation-related fossil fuel and energy, they minimize environmental pollution.

Formulating With Renewable Raw Materials

Henkel chemists utilize a number of renewable raw materials when formulating new hot melt adhesives. Hot melts are formulated from polymers, tackifiers, waxes and / or oils, and Henkel technologists have explored renewable alternatives to each, as shown here.

In line with this effort, Henkel experts have succeeded in replacing non-renewable petroleum-based tackifiers with renewable sources derived from trees, such as rosin and terpene. Recently, soybean-derived waxes were added to our product mix, replacing petroleum-based raw materials. Using these substitutions, Henkel now offers adhesives with renewable content as high as 85%. Additional research in the early development stage is focusing on renewable polymer bases for hot melts.

Technology Is a Tool to Minimize Waste

Henkel has explored a wide range of technologies that provide water-responsive attributes, including the abilities to disperse, wick, release, or biodegrade when exposed to water. Dispersibility has offered the widest commercial success because it allows paper converters to repulp and recycle trim and scrap that would otherwise be discarded. Most ultra-soft two-ply tissues utilize this technology. Ultra-soft tissues use very fine paper fibers and cannot be laminated effectively by traditional embossing processes – a problem solved by Henkel’s water dispersible hot melts!



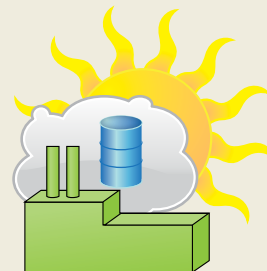
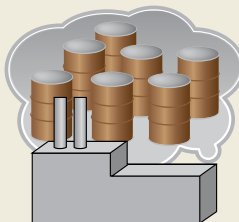
Hot Melt Raw Materials

Non-Renewables

- Polymers
 - Ethylene-Vinyl Acetate (EVAs)
 - Polyolefins
 - Block Copolymers
- Tackifiers
 - Hydrocarbon - Aromatic & Aliphatic
- Waxes & Oils
 - Paraffins
 - Naphthenes

Renewables

- Polymers
 - Soy Protein
 - Starch Esters
 - Polylactide
 - Polyamide
- Tackifiers
 - Pine Rosin
 - Terpene
 - Citrus
- Waxes & Oils
 - Soy
 - Castor
 - Dimerized Fatty Acids



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Technomelt® COOL Cuts Energy Consumption



Henkel Industrial Adhesives Manufacturing Reduces Discharge Water at Berkeley

Henkel Facilities Achieve ISO 14001 Certification



Wal-Mart Packaging Scorecard Measures Performance



A Brand Like a Friend

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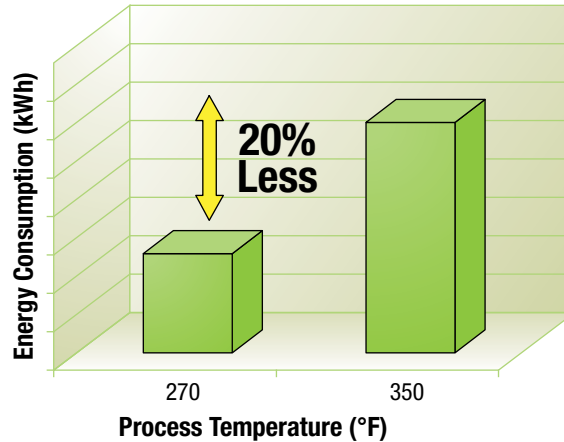
In recent tests, Henkel measured and demonstrated that lowering the application temperature of an adhesive by 80 degrees saved 20% in electrical power. This is significant, because as energy prices continue to rise, it is more beneficial than ever to understand how sustainable products and green-enabling technologies can offset these increases.

In today's demanding economy, the need for accuracy and definition in project ROI is also important. To ensure both, Henkel's Process Solutions (PS) team utilizes Six Sigma methods, applying specific and scientific processes to develop solutions both internally and for our customers. Our PS team has provided resources and solutions for a host of projects that bring more sustainable, efficient products to market, reduce global impact, and cut overall production cost.

In one recent project, members from our Technical Solutions and Process Solutions teams joined forces to completely understand the energy needed to produce adhesive bound books. The goal was to quantify the difference in energy usage between a standard 350 degree Fahrenheit product and a Technomelt® COOL product applied at 270 Fahrenheit degrees. They found that by utilizing COOL technology, the amount of process energy consumed was cut by approximately 20%!

Savings Multiply at the Manufacturing Level

Although the energy consumed to apply the hot melt at a customer's facility represents but a small portion of a finished product's total carbon footprint, energy reduction becomes more significant when looking at the impact of COOL technology at the manufacturing level.



Our complete line of Technomelt® COOL low application temperature, high performance packaging hot melts saves energy and reduces equipment wear. The chemistry allows Henkel customers to achieve good adhesion using less hot melt, and a cleaner running product that generates less waste. Currently, Henkel experts are seeking new ways to improve sustainability characteristics in our hot melts even further.

In line with our sustainability initiatives, Henkel scientists are working to define our overall carbon footprint and take steps to reduce it. (Carbon footprint is a measure of greenhouse gas produced by a person, organization or state in a given time and is usually expressed in units of carbon dioxide (CO2) emitted annually. CO2 emissions are widely thought to contribute to global warming.) Eboni McCray, Senior Applications Engineer, Process Solutions Team at Henkel, analyzed the carbon footprint of energy and found that every 1 kWh of electricity consumed in Kentucky generated 0.81 kg of CO2.* Moreover, every ton of CO2 emitted requires five trees to offset it.** Results from McCray's study can help us calculate our overall carbon footprint and take appropriate actions to reduce it. 🌱

*Carbon Footprint Calculators from:
<http://timeforchange.org/offline-carbon-footprint-calculator>
 **www.carbonify.com/carbon-calculator.htm



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Henkel's AI plant in Berkeley, California, manufactures water-based adhesives to support the paper converting, construction, packaging, and hygienics markets. In 2008, this plant produced a total of 34 million pounds of adhesives. During the past two years, the Berkeley facility implemented changes that significantly reduce water discharge. In fact, daily wastewater usage at the plant has been cut by an amazing 95%. As a result, the local wastewater municipality highlighted Henkel's achievement to other businesses in the area.

Before the Berkeley plant's successful changes, a typical batch with 1% yield remaining in the tank required 5,000 gallons of cleaning water before starting the next batch of adhesive. With new procedures and processes in place, wastewater from the clean-out is now boiled and reused for cleaning.

The Berkeley facility also converted two storage tanks into boil-out tanks for different product lines that use stored water. In addition to reducing water consumption, using water from these tanks cuts energy usage, because the water going into the tanks is already preheated. Moreover, the Berkeley plant collects all first pass water into a holding tank and reuses it for cooling water.

This successful program was managed by Tom Steele and Don Casteel, and implemented by the entire Berkeley team using existing equipment. 🍀

Henkel Facilities Achieve ISO 14001 Certification

Meeting the ISO 14001 2004 standard is helping Henkel reduce the impact of its activities on the environment. Developed as a result of the Rio Summit on the Environment in 1992, ISO 14001 provides a framework for organizations to operate in a way that protects the environment while preventing waste and pollution. Henkel facilities that comply to ISO 14001 are recognized as systematically controlling their impact on the environment and the community.

To achieve ISO 14001 accreditation, Henkel established an environmental policy and management system. Our personnel identified processes and products that affected the environment, and then implemented improvements to control and reduce those impacts.

So far, five Henkel AI facilities are ISO 14001 2004 registered. (See accompanying the table.) Our goal is to have all AI North America facilities accredited by the end of 2009.

To obtain a copy of Henkel's Environmental Policy, contact Isabelle Valois at isabelle.valois@ca.henkel.com. 🍀

Facility	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:2007
Berkeley, CA	X		
Boucherville, QC	X		
Elgin, IL	X	X	X
Greenville, SC	X	X	X
Carol Stream, IL	X	X	X
Cleveland, OH	X	X	X
Kansas City, KS	X		
Lewisville, TX	X	X	X
Memphis, TN	X		
Plainfield, IL	X	X	X
Richmond, VA	X		
Salisbury, NC	X		
Woodruff, SC	X		



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Wal-Mart Packaging Scorecard Measures Performance



Wal-Mart Packaging Scorecard¹ Measures Performance

The "Packaging Scorecard" was developed to help Wal-Mart and Sam's Club accurately measure progress toward reducing packaging by 5% by 2013. Live since February 1, 2008, the Scorecard is a measurement tool that allows suppliers to evaluate themselves relative to other suppliers based on these metrics:

- 15% – GHG / CO2 per Ton of Production
- 15% – Material Value
- 15% – Product / Package Ratio
- 15% – Cube Utilization
- 10% – Transportation
- 10% – Recycled Content
- 10% – Recovery Value
- 05% – Renewable Energy
- 05% – Innovation

These criteria are valuable tools for suppliers to determine how their packaging innovations, environmental standards, energy-efficiencies and use of materials compare with those of their peers. Suppliers can use the scorecard to measure how their product packaging helps Wal-Mart achieve their goals to be 100% powered by renewable energy, create zero waste, and sell sustainable products. ●

¹ www.walmartstores.com

Collaborators to this edition are: Andy Gold, Chuck Paul, David Joseph, Isabelle Valois, Jim Nowicki, Kate Huxford and Richard Stanley.

FOR YOUR REFERENCE: SUSTAINABILITY GLOSSARY OF TERMS

Life cycle assessment: the investigation of the environmental impacts of a given product caused by its existence. The life cycle analysis of a product requires the assessment of raw material production, manufacture, distribution, use and disposal, including all transportation steps during a product's existence. The sum of all of these steps is the life cycle of the product.¹

Triple bottom line accounting means expanding the traditional reporting framework to include environmental and social performance in addition to financial performance. "People, Planet and Profit" are used to succinctly describe the triple bottom lines and the goal of sustainability.¹

A sustainable package:

- Is beneficial, safe and healthy for individuals and communities throughout its life cycle;
- Meets market criteria for performance and cost;
- Is sourced, manufactured, transported and recycled using renewable energy;
- Maximizes the use of renewable or recycled source materials;
- Is manufactured using clean production technologies and best practices;
- Is made from materials healthy in all probable end-of-life scenarios;
- Is physically designed to optimize materials and energy;
- Is effectively recovered and utilized in biological and / or industrial cradle-to-cradle cycles.²

¹ Wikipedia

² Sustainable Packaging Coalition



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