The BONDERITE duaLCys Process

Grow Your Competitive Edge
The BONDERITE duaLCys Process

Henkel has a long history of providing value added cleaners and lubricants for over 100 years. The BONDERITE duaLCys process is a unique concept in the area of machining and in-process cleaning for the metalworking market. It utilizes the synergy of recycling the in-process cleaner into the water soluble cutting fluid and is a perfect symbiosis between cleaner and lubricant, providing high lubricity, superior part cleanliness and excellent corrosion protection. The BONDERITE duaLCys process leverages Henkel’s extensive expertise in both lubrication and cleaning technologies.

Benefits

<table>
<thead>
<tr>
<th>MARKET-DRIVEN TRENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COST REDUCTION</td>
</tr>
<tr>
<td>PROCESS OPTIMIZATION</td>
</tr>
<tr>
<td>SAFETY &amp; COMFORT</td>
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<tr>
<td>SUSTAINABILITY</td>
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**COST REDUCTION**
- Cost saving through low topping up rate of lubricant and extended bath life time

**PROCESS OPTIMIZATION**
- Low reject rate and high surface quality
- Lower consumption and inventory requirements
- Cleaning & lubrication performance in one

**SAFETY & COMFORT**
- Long tool life
- Bactericide & Boron-free
- Eliminates routine biocide additions
- Low foam

**SUSTAINABILITY**
- Reduced carbon footprint due to less product consumption and low temperature application
- Energy cost savings (washer startup and daily operation)
- Low temperature cleaning
- Waste reduction

Needs of the Market

- Process cost reduction by providing low operating concentration and reduced drag out of product
- Reduced water consumption and waste generation
- Improved working conditions resulting from use of safer, more predictable solutions
- Energy savings from operating the washer bath at reduced temperature
By utilizing this innovative process, cost savings of up to 40% can be achieved, compared to a standard product. It is a differentiated technology that provides cleaner running machines when in operation and lower maintenance costs. Henkel has the strong capability to globally coordinate the roll out and transfer of the technology to your other locations.

Characteristics

› Lubricant features pre-cleaning properties due to its combined formulation
› Much better lubricity compared to other high value products = longer tool life possible
› Allows recycling a parts cleaner bath into a lubricant bath
› Lower operating temperature for the cleaning step is possible

› The addition of a cleaner into our ultra-fine dispersed lubricant creates a metal cutting solution that provides excellent corrosion protection
› 100% recyclability of the "waste" cleaner bath
› Can reduce up to 70% product consumption, plus possible energy savings and a significant reduction of the waste disposal volumes

› No routine addition of bactericide needed
› Innovative technology can increase the lifetime of the lubricant bath

Value Chain

Henkel is present across the metal working value chain leveraging its strength in cleaners to complement our strong presence in water miscible lubricants.
The Tangible Advantages in Comparison

**Standard Process**
A typical standard process with a 100 m³ central coolant system

**The BONDERITE duaLCys Process**
With the typical BONDERITE duaLCys process, the customers recycle the cleaner bath into the lubricant bath. It enables up to 40% cost savings as illustrated in the same example with a 100 m³ central system (also suitable for individual machines)

**Costs Across the Process**
Based on a comparison with a typical standard process

- Standard process
- BONDERITE duaLCys process
OVERALL SAVINGS
UP TO 40%

OVERALL PROCESS

HEATING OF CLEANER
BATH

NOT NECESSARY

100% RECYCLING

DISPOSAL OF CLEANER
BATH

100% Waste
every month

100% Recycling

100% Recycling
every month

CLEANING

- Initial Fill: 2% cleaner
- Operating Temperature: 45 °C/113 °F
- Dispose & Clean: Every month

POST STEP

High drag out
(200 liters/day)

Low drag out
(32 liters/day)
BONDERITE dualCys is the Synergy between a Cleaner and a Lubricant

<table>
<thead>
<tr>
<th>BONDERITE L-MR 21466 (Cutting Fluid)</th>
<th>BONDERITE C-NE 10466 (Neutral Cleaner)</th>
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<tr>
<td><strong>PRODUCTS</strong></td>
<td><strong>APPLICATIONS</strong></td>
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<tr>
<td>- Fine dispersed coolant</td>
<td>- Suitable for most substrates, including steel, stainless, cast iron and aluminum</td>
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<td>- High lubricity</td>
<td>- Stable and low foaming in the most common water sources</td>
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<td>- Bactericide free</td>
<td>- Works in combination with BONDERITE C-NE 10466</td>
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<td>- Boron free</td>
<td>- Can be applied at room temperature</td>
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<td>- Excellent corrosion protection</td>
<td>- Can be applied by spraying, high or low pressure or by dipping</td>
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<td></td>
<td>- Compatible with ferrous and non-ferrous alloys to provide in-process corrosion protection</td>
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Sustainability – The Foundation of Henkel

Commitment to leadership in sustainability is one of our core corporate values. Through our sustainability strategy we contribute both to sustainable development and to our company’s economic success. As sustainability leaders, we aim to pioneer new solutions for sustainable development while continuing to shape our business responsibly and increase our economic success. This ambition encompasses all of our company’s activities – along the entire value chain.

Sustainability in the BONDERITE dualCys Process

Cost saving of up to 40% are possible by adopting our BONDERITE dualCys process. Reasons are a lower product-consumption, better bath-life-time, reduced waste and water consumption and plus possible energy savings and tool-life-time. Translated to our Henkel sustainability strategy, the following information can be given:

- High lubricity lubricant (tool life)
- Use of a safer, lower waste, lower consumption chemistry
- Eliminate routine storage and handling of hazardous additives
- No bactericide in any of the products
- Eliminate routine additions of additives
- Low temperature parts cleaner
- Longer lubricant bath life and 100% recycled cleaner
- Using less product to achieve the same functionality