Manufacturing Best Practices for Plant and Equipment Reliability
Henkel. Solutions for All Your Maintenance Challenges.

Maintain, Repair, Rebuild and Protect Industrial Equipment.

Maximizing your production, minimizing unplanned downtime, and preventing equipment failures are critical in every industry. Unreliable equipment can lead to lost time, expensive repairs, and safety issues that can seriously affect your bottom line.

At Henkel, we understand the challenges you face because we have long-term experience maintaining industrial equipment. Henkel and our LOCTITE® brand are the trusted partners of industries around the world to help reduce costs, increase reliability and improve efficiency.

Your Challenges. Our Solutions. Your Benefits.

Henkel provides more than quality products – we provide solutions to many of the biggest challenges facing our customers. Let us put our expertise to work for you.

<table>
<thead>
<tr>
<th>CHALLENGES</th>
<th>SOLUTIONS</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Reliability</td>
<td>On-Site Consulting</td>
<td>Reduced chronic failures. Increased up-time.</td>
</tr>
<tr>
<td>Increase Efficiency</td>
<td>Maintenance Workshops</td>
<td>Increased productivity. Improved efficiency.</td>
</tr>
<tr>
<td>Improve Safety</td>
<td>Machinery Adhesives and Protective Coating Solutions</td>
<td>Reduced hazards from failures. Identified safety improvements.</td>
</tr>
<tr>
<td>Reduce Costs</td>
<td>Industry Maintenance Guides</td>
<td>Extended asset life. Reduced materials cost.</td>
</tr>
</tbody>
</table>

Increase Reliability
Increase Efficiency
Improve Safety
Reduce Costs
Your Solution Partnership Process

Our industry experts can help you **IMPROVE RELIABILITY, SAFETY** and **EFFICIENCY**, and **REDUCE COSTS** through a number of services and programs.

1. Henkel conducts a plant evaluation with your facility or plant management team

2. On-site consulting identifies asset protection, reliability and cost savings solutions

3. Our team plans customized training to implement identified solutions

4. Henkel experts conduct training in departments as needed

5. Henkel continues in-plant consulting to further identify and implement cost-saving solutions

Visit us on the web for more information about maintenance workshops.

[www.henkelna.com/training](http://www.henkelna.com/training)
Mechanical Basics & Failure Fundamentals
Customized Modules - The Core Four

Preventing Fastener Loosening, Rust & Leaks
Sealing & Securing Air/Fluid Leaks On Tapered Threads
Preventing Cylindrical Parts Wear & Replacement
Preventing Gasket Leaks, Repair and Replacement

ADDITIONAL BEST PRACTICES TRAINING MODULES:
Proper Metal Rebuilding & Shaft Repair
Temporary & Permanent Belt Repair
Proper Anti-Seize & Lubricant Usage
Preventing Concrete, Expansion Joint, and Grout Issues
Preventing Slips, Trips, & Falls
Proper Wear Prevention & Rebuilding
Gear Box / Pump Repair & Rebuilding
Surface Protection & Rust Prevention

AFTER A MAINTENANCE WORKSHOP
Your skilled tradesmen will have the knowledge and the cost savings tools to:

SAVE TIME
• Reduce routine maintenance tasks
• Reduce standard repair time
• Reduce redundant repairs

REDUCE ENERGY COSTS
• Air leak 1/16 in. @ 100 psi @ $0.065 per kWh = $842 lost per year
• Loose connector on 480 volt, 30 amp, 3 phase motor = 13% more energy needed to run

IMPROVE SAFETY
• Improve safety by eliminating personal injury hazards

REDUCE FLUID CONSUMPTION
• Hydraulic leak @ 1 drop/second @ $5/gallon = $2,025 lost per year
• Reduce cleanup and disposal costs

AIR LEAK COST CALCULATOR

<table>
<thead>
<tr>
<th>DIAMETER OF OPENING (IN.)</th>
<th>CFM LOSS*</th>
<th>CUBIC FEET OF AIR LOSS/YEAR</th>
<th>COST PER YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/32</td>
<td>1.62</td>
<td>849,139</td>
<td>$210</td>
</tr>
<tr>
<td>1/16</td>
<td>6.49</td>
<td>3,401,798</td>
<td>$842</td>
</tr>
<tr>
<td>1/8</td>
<td>26</td>
<td>13,628,160</td>
<td>$3,375</td>
</tr>
<tr>
<td>1/4</td>
<td>104</td>
<td>54,512,640</td>
<td>$13,498</td>
</tr>
<tr>
<td>3/8</td>
<td>234</td>
<td>122,653,440</td>
<td>$30,371</td>
</tr>
</tbody>
</table>

OIL LEAK COST CALCULATOR

<table>
<thead>
<tr>
<th>LEAKAGE RATE</th>
<th>GALLONS LOST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE DROP IN 10 SECONDS</td>
<td>0.112, 3.36, 40.3, $201.50</td>
</tr>
<tr>
<td>ONE DROP IN 5 SECONDS</td>
<td>0.225, 6.75, 81, $405.00</td>
</tr>
<tr>
<td>ONE DROP PER SECOND</td>
<td>1.125, 33.75, 405, $2,025.00</td>
</tr>
<tr>
<td>THREE DROPS PER SECOND</td>
<td>3.75, 112.5, 1,350, $6,750.00</td>
</tr>
<tr>
<td>STREAM BREAKS INTO DROPS</td>
<td>24, 720, 8,640, $43,200.00</td>
</tr>
</tbody>
</table>

COST PER GALLON* $5.00

*CFM loss may vary based on the shape of the opening and assumes facility maintains air pressure 8,760 hours per year.

COST PER kWh $0.065

*Typical gallon costs range from $1.00 to $2.00. However, the costs associated with leaks need to be considered, such as cleanup labor, absorbents, transaction, shipping, storage, recycling and disposal.
Acme Widgets - Hiddenville, ABC Distribution - Hiddenville, and Henkel Corporation have been working in partnership on various projects. This report contains a review of work completed with respect to the services and value that have been provided to Acme Widgets - Hiddenville in association with ABC Distribution - Hiddenville at no additional charge. The work is summarized as follows:

**Partnership Process Overview**

Henkel Corporation is pleased to be your partner in conjunction with ABC Distribution - Hiddenville in this overview. We are providing the following information as verification of our commitment to providing you with value added services that far exceed the value of the products purchased.

(MRO DISCLAIMER) Due to volume of users and varied uses of Henkel or LOCTITE® branded products, the following are considered estimates and do not include miscellaneous costs.

### 2016 Summary

<table>
<thead>
<tr>
<th>VALUE ADDED</th>
</tr>
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<tbody>
<tr>
<td>Total Activity Count</td>
</tr>
<tr>
<td>Total Hours Invested in Value Projects/Activities</td>
</tr>
<tr>
<td>Value of Test Samples</td>
</tr>
<tr>
<td>Value of Henkel-LOCTITE Engineering Services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COST SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours Saved</td>
</tr>
<tr>
<td>Annual Incidents Eliminated</td>
</tr>
<tr>
<td>Annual Material Savings</td>
</tr>
<tr>
<td>Annual Leak Cost Savings</td>
</tr>
<tr>
<td>Projected Annual Cost Savings</td>
</tr>
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</table>

**Total Value**

$328,238.22

**EXECUTIVE SUMMARY**

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### Challenge

- Pulp and Paper Company: Pulp Fiber Line
- Refiner processing wood pulp at approximately 158° F (70° C)
- Highly Corrosive
- Loosening fasteners due to vibration & leaking bushing
- Causing costly/dangerous leaks

### Solution

- LOCTITE® Threadlocker used to secure flange bolts
- LOCTITE® 620 Retaining compound reliably seals bushing & retainer
- Eliminating this issue will save over 70 hours and reduce 60 repetitive tasks
- Cost savings impact: $59,371

### Benefit

- Eliminate costly and harmful leaks
- Avoid any hazardous disposal costs
- Eliminate slip and fall hazard
- Reduce labor, no need for retightening bolts
- Equipment life extended

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**Cost Savings Documentation**

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