



case study



Forming exhaust components with an **ALTERNATIVE LUBRICANT**

Manufacturer cleans up with gel

By Brad Jeffery

In spring 2000 Zeuna Staerker (www.zeunastaerker.de), a manufacturer of exhaust system components, took a critical look at the lubricant it was using to mandrel-bend 300-series stainless steel tubing. Although the parts it manufactured, exhaust components for BMW Z3® and X5® automobiles, were within specifications, the lubricant generated undesirable housekeeping, disposal, and welding expenses.

The lubricant was 60 percent chlorinated straight oil that did not allow welding without washing and required an aggressive cleaner for removal, which together created an undesirable operator environment and disposal situation.

"The lubricant was an excellent product," said Roger Webb, logistics coordinator for Zeuna Staerker, Spartanburg, S.C. "But it had a high viscosity and a very tacky texture, so it

Lubricant Comparison				
Lubricant Type	Formability	Weld Without Wash	Cleaning and Housekeeping	Disposal
Straight Oil	3	1	1	1
Pigmented Paste	3	1	1	1
Water-soluble Oil	2	2	1	1
Water-based Gel	3	3	3	3

3 = Excellent 2 = Average 1 = Poor

Figure 1

was difficult to wash off of the parts. And, because of the high chlorine content, it tended to dissolve many things it came into contact with."

Technology Options

Zeuna Staerker considered alternative tube bending lubricants and their impact on several key areas—forming, welding, cleaning and housekeeping, and disposal. Each lubricant was rated on a scale of 1 to 3 (see Figure 1).

The study concluded that a water-based gel had the most favorable characteristics for improving housekeeping, allowing welding

without washing, easing disposal, and decreasing costs.

Improved Housekeeping. The gel is applied with an automated in-tool system. Because it has the viscosity of a paste, it stays on the tooling and workpieces and rarely ends up on the floor. The lubricant has no oil or pigment, so it is easy to remove with water, which eliminates the need for an aggressive cleaning solution.

The small amounts that fall onto the floor or remain on the equipment are removable with plain water. This decreases the amount of cleanup time required and improves workstation cleanliness (see Figure 2).

A less tangible yet important benefit is that plant employees value the improved environment and feel more productive.

“Because the previous lubricant had a high chlorine content, it ate through workers’ gloves. Any lubricant that got onto the workers’ skin caused a lot of irritation. Over time it would even dissolve plastic parts. And cleanup required a lot of hot water,” Webb said.

Weld Without Wash and Clean Disposal. The company’s use of gas metal arc welding (GMAW), gas tungsten arc welding (GTAW), and resistance welding has proven that a high-quality weld is possible without washing the parts before welding. The gel nearly eliminates weld repairs and rework necessary to remedy defective welds caused by lubricant residue.

The gel is applied in a thin film in the mandrel-bending operation. Because it is water-based and has a low viscosity, it doesn’t interfere with welding processes.

“We can weld right through it,” Webb added.

In addition, eliminating part washing reduces cycle time, thus increasing output. Also, because the product is easy to remove, postweld component washing is more efficient and effective. Cleaning chemicals perform better and last longer, extending the time between system cleanouts. Washer disposal volume and cost also are reduced.

Small Factor, Big Benefits

Switching to the gel provided one other important benefit: Because it has no oil or pigment, the substance is transparent. In addition, very little gel remains on the workpieces after bending.

“Because it’s water-soluble, the amount of gel that remains is very minute,” Webb said.



These two factors allow a visual inspection of welds without requiring a wash.

Although bending lubricant might appear to be an insignificant factor in an overall manufacturing environment,

Figure 2

Using a gel-type lubricant led to a cleaner, spill-free work environment at Zeuna Staerker.

Zeuna Staerker’s experience was that a lubricant gel can be beneficial and decrease the cost of doing business.

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