

The Revolution of Ceramic-Based Heat Shield Solutions

Engineered ceramic coating technology significantly reduces the cost impact of slag and spatter buildup

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Grinding, chiseling, rejects, rework, replacing welding nozzles and cutting table slats... The hassles, costs, and delays caused by spatter and slag are well known in the metalworking industry. Spatter and slag plague welding, laser cutting, and plasma cutting operations, wasting time, incurring removal costs, and reducing job satisfaction.

Preventing buildup in the first place is ideal, but even when following best practices, spatter and slag still occur.

Costs of slag buildup on plasma cutting and laser cutting tables

When slag sticks to the slats on plasma cutting tables, the buildup may create irregularities in the surface. A table that is no longer flat due to slag buildup can then result in uneven cuts, decreased quality, and additional work down the production line to compensate. If slag continues to build it can even “bridge” between the slats. Bridges act as clogs that prevent air from circulating so fumes aren’t cleared efficiently, resulting in an undesirable working environment.

To produce quality cuts and maintain a safe working environment, slats must be either cleaned or replaced regularly. Cleaning slats is a labor-intensive, physically demanding, unpleasant job often left to “the new guy.” Removing and replacing slats causes a shutdown lasting a day or two when there is zero productivity.

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Shielding slats to prevent slag buildup is now possible with a ceramic solution

The slag problem can now be greatly reduced thanks to ceramic-based heat shield solutions. Ceramic solutions have been used to prevent adhesion in other high-temperature applications such as die casting, but were previously not available in a formula specifically for plasma cutting. E-WELD Plasma™ from Walter Surface Technologies is a ceramic anti-spatter solution that is applied to cutting tables to inhibit slag adherence and reduce the buildup of slag over time. The solution is sprayed on new slats, and then dries for four hours or overnight. Slag that hits the coated slats does not stick; instead, it falls to the floor. The coating lasts for weeks before needing a light re-application.

It is known that ceramic is an ideal coating for withstanding high temperatures; however, a plasma cutting table and environment require a solution that's resistant to extreme heat, wear-resistant, and cost-effective for a large surface area. Walter Surface Technologies, a manufacturer of abrasives, power tools and green cleaners for the metalworking industry, took all of that into consideration, plus the requirement that the solution be non-toxic, and created E-WELD Plasma™.

Reduced slag buildup extends the service life of tables, increases productivity and quality, and boosts job satisfaction

Typically, a plasma cutting table will require a shutdown ranging from one day every six months to two days every three months to remove slag and replace slats. When slats are protected with a ceramic heat shield, they can be used longer before needing to be replaced, and then only a half a day is needed to replace the slats and coat them.



Requiring fewer shutdown days less frequently allows a significant gain in productivity throughout the year.

Ceramic heat shield coatings also eliminate health and safety hazards associated with current cleaning processes such as grinding and chiseling. Coated slats with no slag buildup allow air to circulate for better ventilation. As well, cut quality is improved by maintaining a flatter cutting surface.



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Revolutionary change

After seeing E-WELD Plasma™ introduced at Fabtech 2016, David Mantey, Editorial Director of Digital Media for IEN Magazine called it a “slag slaying show stopper,” adding that it’s “going to take a cleaning process that took an hour with a chisel and a hammer and make it a 5-minute process with a broom.”¹

“E-WELD Plasma™ provides great surface protection which increases the service life of work tables and makes cleaning operations much faster and safer. This is an exciting unveiling for our industry,” says Douville.

Spatter is a root cause of welding rejects and rework

If hot spatter fuses to welding nozzles and tips, the resulting clog inhibits the shielding gas from flowing freely. Poor gas flow can then cause inconsistent welds, porosity, and low quality results with a high rework and rejection rate. Spatter is removable, but it’s unpleasant, not easy, and the costs add up. Dealing with spatter requires a regular investment in spatter-removal equipment such as grinding wheels, additional wire that’s lost in spatter, time spent removing spatter, and time spent reworking welds that were rejected due to porosity. An additional cost is reduced job satisfaction due to a less-than-ideal welding environment. Replacing a dissatisfied welder may not be easy. A CNN Money article listed “welder” as a hard to fill job.² With the competition for skilled welders, the cost of losing an unhappy skilled worker cannot be discounted.

Non-ceramic coatings have limitations

Non-ceramic protective coatings provide some help preventing spatter buildup, but they must be re-applied frequently, still contributing to labor costs. And, gel coatings can liquify and contribute to porosity.



Increase job satisfaction by allowing metalworkers to produce quality cuts on flat, slag-free tables, spend less time cleaning tables, and benefit from efficient air circulation and fume reduction



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Ceramic coatings offer lasting performance

By evenly coating the exterior and interior of welding nozzles and contact tips with a heat-resistant ceramic coating, the surfaces are protected for up to eight hours. E-WELD Nozzle from Walter Surface Technologies is a ceramic spray that resists temperatures up to 1832°F.

Re-applying a non-ceramic coating takes time. Day after day, the costs accumulate. One of our customers tracked the actual costs of using our E-WELD Nozzle ceramic-based solution compared to another gel-based solution they were using on their nozzles. The numbers they reported were impressive. They saw an 81% reduction in the annual cost of nozzle replacement and treatment, and an 80% reduction in the labor cost of removing spatter.



Ceramic spatter and slag prevention solutions allow metalworkers to produce better quality work, and waste less time doing unproductive, unpleasant cleanup



In addition to protecting tables and nozzles, ceramic heat shield solutions can also be applied to nearby areas to prevent pater and slag from sticking to exposed equipment.

Ceramic solutions are a safer, healthier non-toxic choice

Cleaning solutions and coatings can contain toxic or corrosive substances. However, the ceramic solutions developed by Walter Surface Technologies were specifically formulated to be non-toxic and “label-free,” with no hazardous materials.

Unlike some other anti-spatter compounds, E-WELD solutions do not contain harmful chemicals like Methylene Chloride, a known carcinogen which can cause headaches, dizziness, and a wide array of long-term medical issues.



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What production managers can do to optimize their work environment

An optimized and safe work environment will reduce costs and help attract and retain skilled workers. Here are some steps that production managers can take today to optimize their work environment and have a real impact on productivity.

- Evaluate their MRO and/or production processes to uncover problematic areas within their facility.
- Source solutions and estimate the total cost (or cost improvements) of replacing existing equipment/processes.
- Pilot-test solutions in one location to measure effectiveness and real-world cost reductions.
- Deploy solutions across the entire organization once the benefits are proven.
- Use the appropriate safety products to help the workers achieve greater safety and comfort.
- Document the use case and demonstrate the cost savings and contribution to profitability to build support for further optimization and safety initiatives



SOURCES

1. IEN Magazine (2016, November 23). *IEN NOW: Fabtech 2016 Top 10: Part 2* [Video file] Retrieved from <https://www.youtube.com/watch?v=RkULtsQcO6Y>
2. Zhu, Wenquian & Johnson, Angela (2013, September 10). 10 hard-to-fill jobs. Retrieved from <http://money.cnn.com/gallery/news/economy/2013/09/10/hard-to-fill-jobs/8.html>

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About the Author

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About Walter Surface Technologies

Walter Surface Technologies provides innovative solutions for the global metal working industry. From high performance abrasives, power tools and tooling to industrial cleaners, degreasers and lubricants, Walter focuses on helping its customers work better. Founded in 1952, the company is established in 9 countries throughout North America, South America and Europe. International headquarters are in Montreal, Canada and US headquarters are located in Windsor, Connecticut. Key certifications and awards include ISO 9001: 2008, Wall Street Journal Award; Deutscher Material Preis; American Eagle Award; and the CleanTech Cleaning Technology Award.



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