Dry Ice Cleaning for Weld Lines

AUTOMOTIVE WELD LINE CASE STUDY
BETTER WELDS = LESS SCRAP AND DOWNTIME

COMPANY
Maclellan Integrated Services

APPLICATION
Robot & weld line cleaning

COLD JET SYSTEM
Aero 40

BENEFITS
• Savings of $2,956 per station per week
• Labor hours reduced from 7.2 to 0.5 per robot
• $153,712 in annual savings over the traditional method of cleaning (for 38 robot cleanings per week)
• ROI is 344 robot cleanings or 2.3 months

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THE SITUATION
Weld slag, spatter, resin, smoke, oil and dampering adhesive build up on production equipment. This causes misalignment and can prevent the proximity switch from firing in the appropriate spot. The robot stops welding – or welds incorrectly – creating scrap and causing equipment failure and production downtime.

Traditional cleaning methods to remove weld spatter and slag from welding jigs, cells and robots – such as using a hammer and chisel – can damage the weld line equipment and ultimately lead to increased downtime.

Cold Jet dry ice cleaning systems provide an effective, economical and delicate removal solution for slag and spatter build up. Cold Jet’s dry ice cleaning systems use non-abrasive media in the form of recycled CO₂ pellets that won’t damage surfaces. The combination of dry ice cleaning's kinetic energy and thermal effects break the connection between the dirt and surface, lifting away contaminants. Unlike blasting with other media, dry ice cleaning does not leave behind any secondary waste, because the dry ice particles sublime on impact – converting from a solid to a gas. Dry ice cleaning is safe and nontoxic, does not create downstream contamination and reduces exposure to dangerous chemical cleaning agents.

“We are able to do 2-3 times the number of jobs with dry ice cleaning and the outcome is better,” said Steve Foster with Maclellan Integrated Services. “We can also meet the kaizen ‘shared cost reduction’ now using Cold Jet and still make good margins on the job. Lastly, we keep finding more applications for Cold Jet dry ice cleaning systems, ultimately creating additional business for us with the same customer.”

THE PROBLEM
Modern development tools, simultaneous engineering and effective experimentation are equally important in high-modern injection molding. With 100 machines, the
company produces around 3,000 different products. There was one step in the work process that was still done manually: the cleaning of the injection molds.

“Clean tools are a must for the product quality,” explains Dieter Stais, product manager of Marquardt for Riemheim-Weilheim. “Contaminants cause damaged parts and waste. Therefore we clean in fixed cycles.”

For manual cleaning, the tools needed to be removed, installed and aligned again. That’s why they had a production downtime of four hours. In addition, the cleaning was not guaranteed, reliable and became staff related. It could also not be excluded, as the mechanical cleaning could lead to damage or increased wear on the tools. This process needed to be optimized.

THE SOLUTION
Using Cold Jet’s Aero 40 single-hose dry ice cleaning system resulted in the following benefits when compared to hammering and chiseling:

- Reduced required labor from 4 workers to 1.
- Reduced labor time by up to 69%.
- Reduced cleaning costs by up to 60%.
- Drastically reduced equipment damage (though photoeyes and proximity sensors should not be deliberately or directly blasted).
- Dramatically decreased labor intensity because it is safer and more ergonomic for the worker, thus improving overall worker morale.
- Eliminated the use of chemical solvents, thus improving worker safety from the non-use of caustic chemicals.
- Eliminated secondary waste streams because dry ice is solid CO$_2$, which quickly sublimates and disappears upon contact with the surface being cleaned.

ROI / Cost Justification:
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