SURFACE PREPARATION CASE STUDY
COLD JET DRY ICE CLEANING AND SURFACE PREPARATION REDUCES SCRAP AND INCREASES PRODUCTIVITY FOR ELECTROLUX REFRIGERATOR PLANT

COMPANY
Electrolux

APPLICATION
Cleaning contaminants from refrigerator shells

COLD JET SYSTEM
i3 MicroClean®

BENEFITS
The Cold Jet systems reduce scrap, maintenance cost, time cost and overall risk while improving productivity and aligning with Electrolux’s environmental initiatives.

“WE ARE PRODUCING ON PRODUCTION LINES AND DO NOT WANT TO SLOW PRODUCTION TO STOP AND CLEAN. WE ALSO HAVE TO TRAIN 15+ PEOPLE TO USE THE MACHINE SO IT IS IMPORTANT FOR IT TO BE EASY TO OPERATE.”

THE SITUATION
Electrolux Group is the global leader in home and professional use appliances, selling more than 50 million products to customers in 150 markets each year. Electrolux kitchen products account for almost two-thirds of the Group’s sales and are well-represented among the most energy-efficient alternatives. The Electrolux Refrigerator Factory located in Nyiregyhaza, Hungary was built in 2004 as a green-field investment. They produce combination refrigerator/freezers (combi-bottom) and also one door refrigerators and freezers.

During the refrigerator/freezer manufacturing process, insulator foam is injected between the inner liner and the shell to ensure thermal insulation. If there is any minor leakage between the coupling parts, the foam fills the holes and can leave foam remnants on the surface of the product. Because Electrolux Nyiregyhaza products are for home and professional use, it was crucial that the products be 100% clean of any dirt, debris and insulator foam.

THE PROBLEM
In the past, Electrolux Nyiregyhaza used chemicals and hand-tools to remove the contaminants from the surface of the refrigerator shells, as well as to clean the foaming equipment and jigs during production. These methods were time and labor intensive and sacrificed the quality of the product. They were also very slow because they were done manually. The hand-tools had safety risks and would likely lead to scratching the surface of the shell. If the product was scratched, it would be discarded as scrap and could no longer be used in production. This was costing the company a significant amount of money each year. The company needed a solution that would provide a good clean and eliminate the possibility of damaging the product or injuring workers.

Lean manufacturing was also important to the plant. László Koncsek is the Lean specialist and his Lean manufacturing program includes 5S, Productive Maintenance and Autonomous Maintenance requirements. The cleaning solution needed to coincide with these efforts.
"The other driving factors in choosing the right cleaning solution were speed, whether it was user-friendly and overall quality and cost," said Koncsek. "We are producing on production lines and do not want to slow production to stop and clean. We also have to train 15+ people to use the machine so it is important for it to be easy to operate."

THE SOLUTION

Koncsek and the plant manager consulted with the Electrolux plant in Italy and discovered that they successfully use Cold Jet dry ice cleaning as their solution. The solution had been working very well for them and they recommended it be given a try.

Dry ice cleaning uses recycled CO₂ in the form of solid dry ice particles that are transported by high-velocity airflow to remove contaminants from surfaces. The dry ice particles are accelerated through high-velocity nozzles onto the surface being cleaned. The combination of the kinetic and thermal gradient effects breaks the bond between the foam and the surface of the refrigerator. The dry ice particles sublime on impact, transitioning from a solid to a gas, leaving no secondary waste behind.

Dry ice cleaning is a non-abrasive, nonflammable and non-conductive cleaning method. It is environmentally-friendly and contains no secondary contaminants such as solvents or grit media. It allows items to be cleaned in place without time-consuming disassembly. It can be used to remove production residues, release agents, contaminants, paints, oils and biofilms and for many general cleaning applications.

Electrolux Nyiregyhaza purchased three Cold Jet i³ MicroClean dry ice cleaning machines and one i³ Ice Press. The i³ MicroClean features Cold Jet’s patented shaved dry ice technology.

It is an environmentally responsible system that enables cleaning delicate surfaces and complex cavities and crevices that other machines can’t reach—without surface abrasion, disassembly or harmful secondary waste. With an Ice Press, they can create a consistent high-quality dry ice block from pellets, nuggets or even scrap dry ice in less than three minutes, whenever they need it.

“The Cold Jet i³ MicroClean systems reduce scrap, maintenance and time costs, improve productivity, align with our environmental initiatives and reduce overall risk,” said Koncsek. “The i³ MicroClean systems are more efficient with relation to the quality of the clean, and the speed has improved our business.”

Production teams clean on an as-needed basis and like that the machine is portable and can easily be moved around to use in multiple areas.

“When we saw how successful and mobile it was, we decided to also use it to clean the tools and equipment in addition to refrigerator shells,” said Koncsek. “We can incorporate dry ice into many facets of the company.”
The Electrolux Nyiregyhaza plant has already calculated their return on investment and found that they have been able to recuperate the cost of the machines based on scrap savings alone. The Cold Jet dry ice cleaning machines have proven to be a value-add investment for the company.

In addition to the Hungary location, Electrolux has Cold Jet dry ice cleaning machines in Australia, Thailand, Italy, Egypt and the United States. In the U.S., they use the MicroClean to deflash polyurethane foam.

“THE COLD JET MICROCLEAN SYSTEMS REDUCE SCRAP, MAINTENANCE AND TIME COSTS, IMPROVE PRODUCTIVITY, ALIGN WITH OUR ENVIRONMENTAL INITIATIVES AND REDUCE OVERALL RISK.”