



advanced
clean production
acp-systems.com



Case study

Weld residues removed reliably in high volume production

acp systems AG -
technology leader for advanced clean production

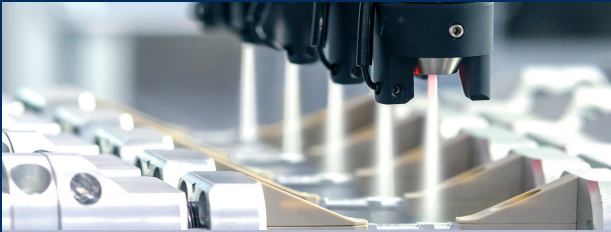


Subject of the case study

STIWA Advanced Products GmbH is a global supplier of high-quality complex parts and assemblies for the European Automotive industry. Alignment of production to ever higher cleanliness requirements is an essential aspect of this quality claim. Towards achieving these quality targets, an integrated inline CO₂ snow-jet cleaning process from acp enabled the company to reliably and repeatedly clean laser welding assemblies from high quantities of welding residues. This cleaning technique obtained with MAP PAMMINGER GMBH, exceeded the specified cleaning requirement by a factor of 10.



quattroClean
technology



CO₂ snow-jet cleaning

Objectives in Manufacturing

Dry, particle and film free products



Features & benefits

- Dry, chemical-free cleaning
- Fast & efficient (no drying cycle required)
- Residue free
- Selective
- No chemicals or wastewater
- Kind on the environment (recaptured CO₂)
- Manual or automated

Requirement

STIWA secured a long-term order from a German car manufacturer for a high-volume transmission part, specified to a very rigid requirement for the level of residual contamination after welding. Components need to be completely free of loose weld spatter and soot, so production targets specified a measured mass of contamination after welding of 1.5 mg together with a high capacity cycle time of 3.5 – 4.5 seconds. With tight mechanical tolerances for subsequent assembly of the components, close temperature control after cleaning is also essential, requiring selective cleaning of the critical surfaces only. The scope of these production targets, of cleanliness, cycle time, and temperature control defined a requirement for an inline, fully automated, repeatable dry-cleaning process.

Solution

After independent evaluation to validate the process, an automated system with an integrated CO₂ snow-jet process module (JetModule®), was designed by STIWA Automation and acp systems AG. A robot places the parts onto work-piece carriers transported into the cleaning cell. Depending on the variant, up to 20 weld seams are processed per assembly, in four separate cleaning chambers, each with its own fixed nozzles set to selectively clean specific weld seams. In this way assemblies are processed in series, covering all the weld seams to the production capacity required. This design between acp systems and STIWA Automation was reached very quickly.

acp systems AG Ditzingen

Berlingerstraße 8 · 71254 Ditzingen
Tel. +49 (0)7156 48014 - 0 · info@acp-systems.com
www.acp-systems.com

Why acp?

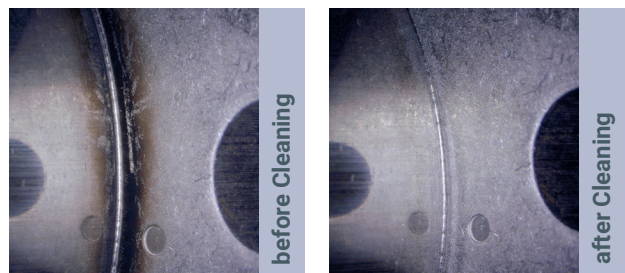
Through contact with MAP PAMMINGER, process development engineers from STIWA were made aware of the advanced CO₂ snow-jet cleaning process of acp systems AG at a specialist conference for industrial component cleaning. Various combinations of alternative technologies were evaluated including, solvents, ultrasonic cleaning, and compressed air before the quattroClean® technology of acp systems AG was selected as the technology of choice.



STIWA Advanced Products GmbH in Gampern produces a wide range of complex parts for the European automotive industry

Summary

After independent testing of the process at the Fraunhofer Institute in Berlin, CO₂ snow-jet cleaning was accepted as a viable alternative, and acp systems AG was subsequently commissioned via STIWA Automation and MAP PAMMINGER. Adhesive forces of 5N from weld spatter attached to the complex geometry of a variety of components could be overcome by the design and orientation of the nozzle technology. This CO₂ snow-jet process was integrated into a turn-key automated solution by STIWA Automation from a modular system (JetModule®) supplied by acp systems AG. The cleanliness target was 1.5 mg of contamination; the final solution achieved this by a factor of 10 to 0.1 mg.



Example from another weld residue project

acp systems AG Zimmern ob Rottweil

Albring 18 · 78658 Zimmern ob Rottweil
Tel. +49 (0)741 175299 - 0 · info@acp-systems.com
www.acp-systems.com