



Cleaning Braking System Parts: Burr and Chip-free Workpieces in Short Cycle Times

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Opening photo: The new high-pressure water jet system enables the manufacturers of brake cylinder housings to safely obtain burr and chip-free workpieces while increasing throughput.

The production of brake cylinder housings requires completely burr and chip-free workpieces to be obtained in order to meet the high quality requirements of customers. A specifically adapted system technology has made this possible.

A manufacturer of passenger car brake cylinder housings wanted to improve its process in order to make it burr and chip-free as well as achieving maximum process reliability and flexibility. The company also needed short cycle times to be obtained:

a processing time of ten seconds per housing was required at the beginning of the project. These fist-sized components are the core of a car brake system, and therefore no burrs nor manufacturing residues can be tolerated on their surfaces.

The aluminium formed parts have a complex shape with numerous grooves, fits and threaded holes, as well as several oblique oil channels across different cylinders. In addition, they undergo machining operations such as precision turning and reaming, which further increase the requirements imposed to the cleaning process.

Ideal also for rotationally symmetrical components

A standard system was not an option for this application because it would have not met the cycle time requirements. Moreover, the customer intended to use the machine also to treat rotationally symmetrical components. Finally, the optimal component placement had to be determined beforehand in order to ensure consistency.

Piller Entgrattechnik decided to specially redesign its proven VectorJet IV system for this task. The result was a multiaxial high-pressure water jet plant comparable to a machining centre and equipped with different high-pressure tools in order to solve any burr and chip issue (**Ref. opening photo**).

A specially adapted plant

Two components are processed simultaneously in order to ensure short cycle times. Each part has its own controlled rotation axis. While two workpieces undergo the high pressure machining treatment, two finished parts can be removed from their fixtures and two new ones can be loaded. The non-productive times are therefore reduced to zero and the high-pressure pump is fully exploited.

The operator has the opportunity to adapt and optimise the process at any time, like on a machining centre. This is crucial, in case the geometry of the components changes or individual process steps need to be adjusted. In this way, the system can also be used with other rotationally symmetrical components.

“For its application, the manufacturer of brake cylinder housings has deliberately chosen an automated high-pressure solution. This enables the company to perform a safe, burr and chip-free process even on complex components, combining high output and flexibility in one plant.”

Processes designed to be energy-efficient

The whole design of this compact plant (process area, high-pressure generation, tank and bath maintenance, and filtration

system) was based on Piller’s VectorJet IV system concept. This also resulted in very quick installation and commissioning operations. In order to reduce the energy costs of the system, special attention was paid to the high pressure process. The high-pressure injection devices and the spray program were designed so that the smallest possible amount of water is needed to remove contaminants. For its application, this manufacturer of brake cylinder housings has deliberately chosen an automated high-pressure solution. This enables the company to perform a safe, burr and chip-free process even on complex components, combining high output and flexibility in one plant. ○

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