Innovative Robotic Solution: Fully Automatic Vibratory Finishing

ONE OF OUR CUSTOMERS has been using vibratory finishing for the deburring and polishing of delicate precision aluminum components for many years. However, until now the components had to be protected against nicking during the finishing process requiring time-consuming and expensive manual labor. This challenge was solved by the installation of an innovative, fully automatic cleaning, deburring and polishing system which allows the finishing of around 30 different work pieces without the parts ever touching each other during the process. For this challenging application Rösler not only developed the material handling concept but, with the High-Frequency-Finishing (HFF) system, also a completely new vibratory finishing method.

Fully Automatic Operation

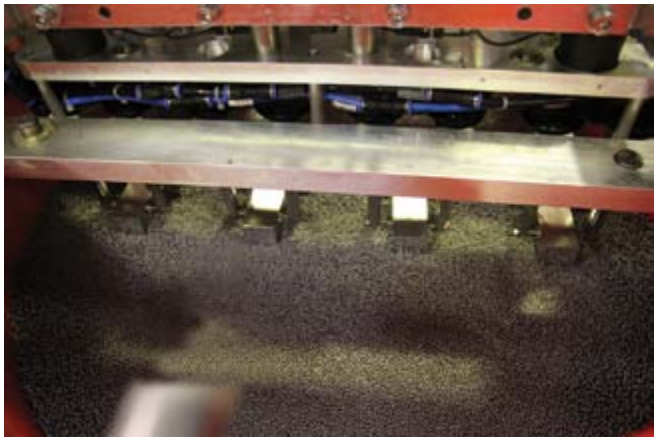
At the center of this ground-breaking fully automatic system is a robot equipped with a gripper that vibrates at very high frequencies during the HFF process. Different grippers are utilized to accommodate the various work piece shapes and sizes. After the machining operation the parts are placed on a conveyor belt in an exactly defined position. Once they arrive at the finishing system the robot picks up four parts at a time. In a first step – degreasing and cleaning – the robot dips the parts into a cleaning tank. This is followed by the HFF vibratory finishing process including a rinsing and blow off phase. Finally, the robot places the aluminum components back on the conveyor belt for transport to the next manufacturing operation.

High-Frequency-Finishing (HFF), a newly developed vibratory finishing process produces excellent and absolutely repeatable deburring and polishing results in very short cycle times.

HFF – Excellent and Repeatable Finishing Results in Short Cycle Times

During the HFF process the robot gently dips the high frequency vibratory gripper with the 4 mounted work pieces into the work bowl filled with spherical stainless steel media. The gripper vibration with 3000 RPM and the movement of the steel media induced by the vibratory drive of the mass finishing machine produce an intensive and homogeneous media flow around the work pieces. Furthermore, during the finishing process the robot can take the work pieces out of the work bowl to turn them at a defined angle and dip them back into the media mass. These two independent media movements, in combination with the compound and media precisely adapted to this process, yield excellent and absolutely repeatable deburring and polishing results in very short cycle times.

Depending on size and shape of the respective work pieces, the complete operation, including picking the parts up and placing them back on the conveyor belt, lasts between 180 and 300 seconds.



The robot picks up four work pieces at a time from the conveyor belt and runs them through the process steps, degreasing, HFF, rinsing and blow off.