Photos: Arku Maschinenbau

A deburring machine always works on the sheet surface, applying an appealing finish.

Aluminium deburring without risk

Burrs are almost impossible to avoid completely. They can cause damage or injuries, therefore thorough and safe deburring is essential.

STÉPHANE ITASSE

Whether punching, laser or plasma cutting – anyone who cuts aluminium sheets will almost always find burrs on the cut edge. These are protruding metal residues that are often sharp and pointy. Therefore, they can cause damage or impair the quality and safety of the final product. Deburring also rounds off the sharp edges of the cut parts.

There are three important reasons for deburring: The first is safety. Sharp burrs and edges can cause injuries and damage. This applies both when they are still attached to the workpiece and when they have already fallen off and are, for example, in the final product. Secondly, burrs can impair the fit of parts. This causes premature wear on the final product. Last but not least, deburred parts look clean and professional.

Better to deburr with machines

Although sheets and parts can also be deburred manually with files, scrapers or angle grinders, this method is time-consuming and only suitable for very small quantities. Moreover, the results are not consistently accurate. It is more productive to use special deburring machines instead. This method is more efficient and consistent. Deburring machines usually remove burrs using brushes or abrasive belts. At the same time, they round off the edges, which can be very sharp after cutting.

There are no specific deburring machines for aluminium. Since the material – depending on the alloy – is often softer than steel, the deburring machine may need to be setup differently. In modern systems, software helps with this. Additionally, different tools are used; abrasives with silicon carbide grains are particularly common in aluminium processing.

Sheet metal specialist Autz + Herrmann from Heidelberg has made first-hand experience of the difference the right deburring machine makes. Daniel Gabriel, head of punching, laser processing and programming, is very impressed with the Arku deburring machine Edge Breaker 6000: “We used to have to assign an employee for manual deburring, now it’s super fast,” he says. The quality is also

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right, he reports: "We have a new product for medical technology made of five millimetre thick aluminium. It's difficult to laser and relatively delicate. But it can be well processed with the Edge Breaker, after which the actual bad side is even better than the good side."

Wet extraction makes the difference

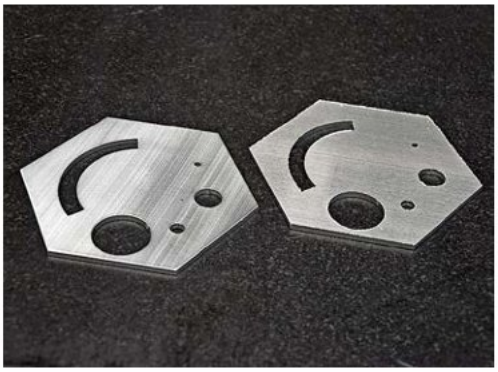
However, the most important difference for aluminium processing is made by a component of the deburring machine. Aluminium dust is generated during this process, posing a risk of fires and explosions. Therefore, a good extraction system with a wet separator is essential. It allows aluminium to be deburred even with a dry deburring machine. However, dust nests occasionally still form in the system, which must be manually removed with an industrial vacuum cleaner. A wet deburring machine, on the other hand, is not necessary. These machines are expensive to operate and cumbersome to maintain.

In practice, the many advantages of a dry deburring machine compared to a wet-working system are evident: The Luxembourg sheet metal worker TMS Metall- und Stahlbau S.A. used a wet metal deburring machine before acquiring an Edge Breaker 6000 from Arku. This left water stains on the workpieces, for example. Above all, the maintenance effort was immense. "The mixture of grinding dust and water was almost like concrete after drying," reports operations manager Johannes Hemmer. The old deburring system also had to be disassembled for cleaning and parts had to be sprayed down with a high-pressure cleaner in the yard. "Now you just have to open the door, drain the water for the wet extraction every two days and vacuum with the industrial vacuum cleaner. Overall, it's a much cleaner and easier job," he says.

Further advantages become apparent in mixed operation. "Wet deburring is problematic for steel parts because rust forms. Therefore, we only processed stainless steel and aluminium on the old system," Hemmer explains. With the Edge Breaker, TMS can now process all materials.

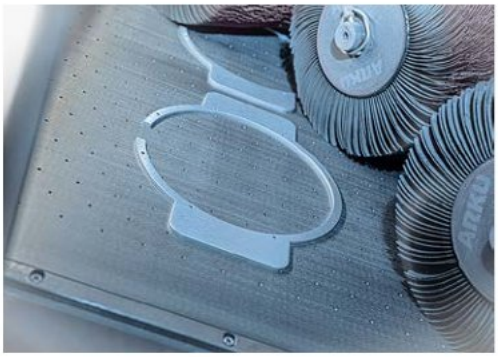
Special caution is necessary

However, special precautions apply to mixed operation. Essentially, aluminium and other materials must be deburred separately. Steel can spark, especially during grinding. However, you can still deburr safely with three basic rules: Firstly, each material requires its own set of tools. This prevents material particles from being transferred via the tools. Secondly, the deburring machine must be thoroughly cleaned with each material change. Thirdly, the different metal dusts must also be thoroughly separated during disposal.

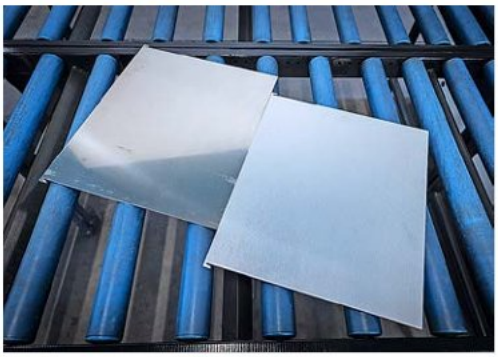


The burrs on the edges of the right-hand part can impair further processes and the final product, which does not happen with the deburred part on the left.

Modern deburring machines can be easily adjusted and adapted to the requirements of aluminium.



The deburring machine Edge Breaker 6000 can work with delicate parts.



Many customers now only want deburred parts, as shown in the picture on the right.

Quick-change systems for the deburring tools are therefore worthwhile, especially in mixed operation with steel, stainless steel and aluminium. This saves setup time for the employees, and the productivity of the deburring machine remains high.

Overall, it can be said that aluminium presents some special challenges for deburring. However, with the right equipment and the right procedures, burrs on aluminium sheets can be removed safely. ■