BUFFOLI INDUSTRIES | GIORNALE DI BRESCIA

LEAD-FREE BRASS: CHALLENGES, SOLUTION AND OPPORTUNITIES

Buffoli Transfer, in collaboration with Ubr Utensili and Csmt Digital Innovation Hub, sponsored an important discussion on the topic of the transition to lead-free alloys. The conference, titled “Lead-free alloys: can we remain competitive?” was held on March 5 at the Csmt and was attended by a number of Brescia-based manufacturers in the plumbing and heating sector.

Challenge.

EU Directive 2020/2184 stipulates that, as of January 1, 2027, the lead content in brass intended for contact with drinking water must be reduced first to 0.2 percent and then to 0.1 percent. For the Italian industry, this transition represents a complex challenge, especially for companies in the Brescian and Valsesia regions, territories historically dedicated to brass processing.

Critical aspects.

The elimination of lead from brass profoundly affects the machinability of the material. New alloys, such as CW510L, CW511L, and CW508L, generate longer chips that are more difficult to evacuate, requiring an increase in feed rate and depth of cut to achieve effective breaking. However, these variations increase the material's resistance to cutting, generating more friction and a consequent rise in temperature at the cutting edge, especially in alloys with lower thermal conductivity such as CW724R. This leads to faster tool wear, with formation of carryover material on the cutting edge that generates vibration and reduces the quality of the surface finish. Another critical aspect is the higher cutting force required for machining new alloys. CW511L, for example, requires up to three times higher cutting forces than CW614N, increasing stress on work units and workpiece clamping systems.
Cutting torque is also significantly higher, with CW511L reaching 3.5 times higher values than conventional alloys. These factors dictate the use of more robust machinery and operating units with higher torque ratings. An additional difficulty concerns burr formation during drilling and tapping operations. The CW511L, in particular, generates burrs up to six times higher than theCW614N, necessitating additional deburring operations for threads,
hole intersections and polygonings. This necessitates revised work cycles and the addition of dedicated stations for automated deburring.

Solution.

To ensure effective machining of lead-free brass, it is necessary to use machinery equipped with high-speed, high-torque spindles, such as electrospindles with synchronous motors, which allow some operations to be replaced
turning operations with more efficient milling processes. Lubrication and cooling systems must operate at high pressures of 40 to 80 bar to reduce friction, prevent overheating and improve chip management.
In some cases, the use of oscillating feed can help reduce chip length, but results in increased burr formation and increased mechanical stress on the machine.
To optimize chip management, it is essential to adopt large evacuation and filtering systems, and in the most critical cases, as with the CW511L, the use of shredders to reduce chip volume may be necessary.
Buffoli Transfer-present at ISH-has developed advanced solutions in this field, providing optimized machinery for processing lead-free brass, both from stamped and bar stock.