

Automotive manufacturers strengthen seat belt buckles with ultrasonic welding technology

BENEFITS

- Weld withstands shock of high impact
- Assembly provides easy seat belt buckle operation
- Assembly process becomes industry standard



APPLICATION

Automotive seat belt buckles

CHALLENGE

Automotive seat belt buckles underwent a dramatic design change when the lift-cover buckles similar to those used in airplanes were replaced by the snap-in/push-button type now in use. The design changed from a simple, three-piece, forged-metal component to a much more complex 10-piece assembly using a combination of both metal and plastic parts.

The new buckles' more complicated internal components had to be assembled before sealing them inside a plastic housing. And while ease-of-use was critical, and the latching mechanism had to be strong, it was equally vital for the buckle housing to be able to withstand the forces applied to it during extreme impact. If the housing material shattered or the joint gave way, the latch integrity could be compromised or the housing parts themselves could cause injury.

Manufacturers tried a snap-fit style that was economical but could not withstand the shock of impact. Adhesive bonding proved to be too costly from a consumables and a manufacturing process standpoint. Finding the right combination of part design, material, and joining method was a complex challenge.

SOLUTION

A major automobile manufacturer reached out to Branson ultrasonic technology available from Emerson for expertise in plastics joining.

Seat belt solution

Branson ultrasonic welding technology becomes the industry standard for automotive seat belt assembly.

Working closely with the manufacturer's design and technology teams, Branson spent several months developing custom polymer blends with the necessary mandates of lightweight and strength. After a variety of weld trials, a solution finally emerged that worked best and met all the desired objectives. The solution was Branson ultrasonic welding technology.

Ultrasonic welding is a technology that is proven to have the flexibility to weld a wide variety of materials and create weld joints of remarkable strength. The weld process delivered the ease-of-release needed and exceeded the strength required to handle high impact.

In fact, the joining process has been proven by a number of automotive manufacturers and is now the industry standard for assembling seat belt buckles.

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