Vibration welding produces Air Intake Manifolds (AIM) easier, faster, and at far less cost for car makers worldwide

RESULTS

- Delivers weld strength to withstand extreme burst pressures
- Capable of welding complex part geometries
- Cuts material and maintenance costs
- Produces parts in a fraction of the time of previous processes

Taking "AIM"

Branson was a pioneer in vibration welding technology and a leader in bringing an application to market that produced dramatically shorter cycle times and lower costs.

APPLICATION

Automotive air intake manifold

CHALLENGE

The air intake manifold (AIM) delivers the air (oxygen) needed to generate the combustion that drives the cylinders of an automotive engine. The manifold consists of 4-to-12 tubular chambers, each one of which delivers the oxygen to its respective cylinder heads for combustion. The manifold must be absolutely airtight, as well as capable of withstanding the burst pressure created when the cylinders fire.

To decrease the weight of their cars, manufacturers used aluminum to produce one-piece manifolds through a process known as "lost core." When polymer science began producing plastics that had the necessary strength, car makers switched to plastic lost core. The process was complicated and costly, requiring the production of a die, a core, the die-cast part, removal of the core, and cleaning the finished one-piece manifold.

The change from aluminum iron to high-strength plastics lowered the weight, but lost core was such a complicated, expensive, and time-consuming process, it did not meet the industry's increasing need for higher-volume production. The need was great to reduce cycle time and have a more flexible assembly solution.

SOLUTION

During the 1990s, advances in polymer science and plastics welding technology resulted in car makers switching from lost core plastic casting to plastic welding. The change was a milestone event, and during the early 2000s, more and more car makers turned to Branson technology available from Emerson to improve and replace their lost core technology.

BRANSON

EMERSON

Branson vibration welding allowed the manifold to be made by joining two halves, rather than molding a single piece. That reduced cost and cycle time. The process joined the upper and lower plastic shells of the newly designed manifolds with a weld that was proven to be not only airtight, but also capable of withstanding the burst pressures generated by engine combustion.

Vibration welded parts could be produced in a fraction of the time required of the lost core method, and the technology could also accommodate the complex geometrical shapes required of air intake manifolds.

With its high-strength weld quality and virtually seamless appearance, vibration welding has become the industry standard for the production of air intake manifolds.

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