

Dr. Fastener Questions- Electric Vehicle

by Laurence Claus

Q1

Are the fasteners used in electric vehicles different from those used in internal combustion engine (ICE) automobiles?

A1: Yes and no. The ‘No’ part of this answer is derived from the perspective that electric and ICE vehicles share many of the same attributes and systems- for example, interiors will be pretty similar in both types of vehicles as may be traditional braking, steering, HVAC, seating, suspension, and other systems. Therefore, they will use similar or even the same fasteners for these systems. However, the ‘Yes’ part of the answer comes from the perspective that EVs have systems and components not present on ICE vehicles. These systems may contain fasteners that are different or used in different quantities than in ICE vehicles.

Q2

How is the fastener industry addressing lightweighting?

A2: Lightweighting is one of the automotive industry’s most pursued activities at the moment. It is particularly interesting to the new EV companies, as they are trying to get an edge in the market as well as maximize their vehicle’s operating range. Lightweight vehicles help achieve these purposes. Fastener manufacturers are addressing their customer’s needs by both offering direct lightweighting such as manufacturing parts out of aluminum and offering new innovation that enables their customers to lightweight their products.

Q2A

What innovations are being made in vehicle body lightweighting technology?

A2A: Much is currently on the drawing board in both EV and ICE vehicles relative to innovation of new lightweight body technology. Some new vehicles are entirely aluminum, although the majority of new vehicle designs are hybrid structures, meaning they are a combination of multiple different materials; mild steel, ultra-high strength steel, aluminum, magnesium, and carbon fiber. In particular many new designs incorporate high and ultra-high strength steels. These are particularly attractive because they increase strength and performance while reducing gage thickness (resulting in substantial weight savings). These materials, however, are also problematic because they have few, if any, effective joining options. One company that is leading the innovation in this area is Germany’s EJOT GmbH, with the release of their FDS® flow drilling screw for one-sided joining of aluminum and their EJOWELD® for joining aluminum and ultra-high strength steel.

Q3

How will an increase in production of EVs change the fastener industry?

A3: EVs will share many of the same systems, components, and parts as ICEs; however, some systems will differ. Take for example; an ICE is propelled by an engine while EVs utilize batteries and generators. The elimination of certain components and systems will result in the elimination of those fasteners which are specific to those ICE systems. Therefore, quantities of these specific fasteners will decline. On the other hand, EV systems like batteries will demand greater quantities of fasteners providing an opportunity for fastener suppliers to those customers utilizing these systems.



Q4

Are there any special fastener designs used for EV fasteners?

A4: Of course there may be some components unique to EVs, but more likely the greatest increase will be in fasteners that can be applied in multiple applications but have found a niche in EV systems because they provide some application advantage over other fastener designs.

Q5

Are there any special processes/features that fasteners used in EVs will need to possess?

A5: Fasteners in some of the EV systems may have special features such as zinc-tin plating or underhead serrations to provide electrical contact advantages uniquely necessary to EV systems.

Q6

Can you explain why zinc-tin plating is interesting for EV applications?

A6: Zinc-tin has the advantageous characteristic that it can be swaged and compressed without cracking. This is particularly advantageous for electrical connections.

Q7

How will EVs change the landscape of vehicle systems needed in the vehicle?

A7: Again, EVs and ICEs will share many of the same systems; however, EVs also will have some unique systems. Foremost among these will be the electrical and electrical distribution system including the battery pack and associated components. However, other components will be unique as well, such as regenerative braking and generator systems.

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