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Battery Pack Electrical Connector Leak Test Plug

When a battery pack assembly is to be leak tested, all electrical connectors that are not potted will need to be sealed to ensure pressure inside of the battery pack is isolated from the external environment. This ensures that an accurate battery assembly leak test can be performed and all components that are mated are tested with no pass-through characteristics present. In many cases, whatever plug or tool that is used to seal the connectors also must combat gravity and be able to seal no matter which direction.

A method is proposed to utilize a plug that seals inside of the battery connector and utilize features on said connector for retention features. These plugs can utilize either a radial seal or face seal depending on the surface area that is available.

Method

As an example, consider a set of electrical connectors that are attached to a header which is seated and sealed against some flat surface (Figure 1). Again since, there is a leak path into the cavity through the connector, when a leak test is performed, something needs to plug these areas. The traditional method is to utilize the mating connector that has the extended wire cut and either potted or sealed with heat shrink. The concern with this, is with tool wear as the mating connectors are not designed to be able to be inserted and removed for normal production volumes.

Figure 1: Example Connector Piece

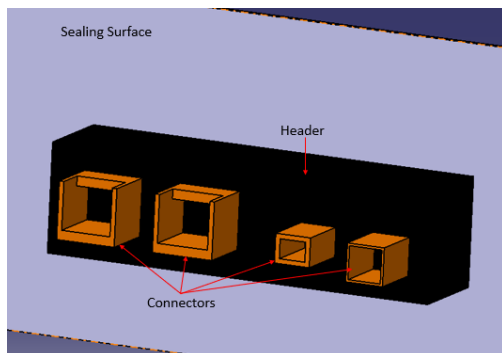
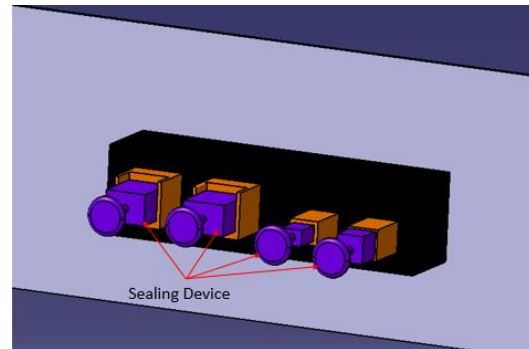


Figure 2: New Method of Individual Sealing Devices



The individual sealing devices are designed to be reused and repaired easily. If a seal were to tear/wear, then a new one can easily be replaced. The first new method of sealing would utilize a face seal and retention method on the connector. Once the plug's is retained, an operator can rotate the knob to adjust the fore/aft distance of the plug. As you adjust the plug further, you generate a force on the face seal of the plug that seals off the connector from the outside. Figure 3 shows this type of sealing device. When using a radial seal style new connector, the retention device is used to combat gravity, but that is its only function. Once retained, the operator can utilize the fore/aft adjustment to bring the extended portion down onto the seal and compress it. As the seal is compressed, it expands radially onto the radial face of the connector and generating a seal. Figure 4 shows this type of sealing device.

Figure 3: New Connection Device Face Sealing Method

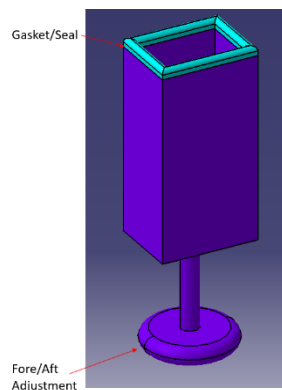
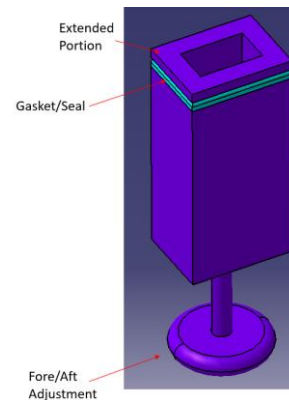


Figure 4: New Connector Device Radial Sealing Method



Conclusion

By utilizing these types of sealing plugs, the overall tool life increases exponentially and there will be less downtime on the assembly line. The new method of sealing is robust in a production environment and minimizes downtime throughout the life of the line. Furthermore, this method reduces the possibility of pass-through characteristics and ensure whatever is leak tested is of the best quality.

In conclusion, a method of sealing on individual electrical connectors has been presented that is more robust and is easily serviceable. This tool may cost more to machine or make than a nominal mating connector, but it offers better feedback for operators to ensure the seal has been made. With these devices, there are less opportunities for false-positive or false-negative leak test results.

Disclosed Anonymously