Water immersion test

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Battery Pack Liquid Exposure

• Batteries can be subject to liquid exposure due to a variety of conditions
  • Regulatory requirements
  • Typical vehicle usage
  • Extreme storms and floods
Liquid Compatibility Considerations

• Types of events
  • Short term considerations
    • Immediate short circuit
    • Electrolysis
  • Long term considerations
    • Corrosion
    • Dendritic growth

• Compatibility of pack internal electrical components with liquids
  • Sealing
  • Location / spacing
  • Current interruption
Key Messages

• Test method determination must FOLLOW development of an appropriate objective

• Objective based on actual field exposure considerations, not infrequent anomalies
  • Drive vehicle through water
    • Depths greater than 300 mm not realistic for most vehicles.
    • “According to FEMA, a foot of water will float many vehicles.”
      • FEMA – Federal Emergency Management Administration (U.S. government agency)
      • Source: https://weather.com/safety/floods/news/flash-flooding-vehicle-danger-20140717
  • Complete vehicle flooding possible, but unlikely
    • Vehicle not in use at time
    • Infrequent event
Recommendation

• Retain current water test conditions
• IF FIELD DATA SUPPORTS, consider increase in water depth, up to maximum of 300 mm
• GTR should not include a full battery pack submersion test