

Do Conductive Residues on Electrical Wires and Contacts in Aircraft Fuel Tanks Pose a Combustion Hazard? Part I. Formation Mechanism

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Conductive deposits that have been found on the wiring and electrical contacts of fuel quantity indicating sensors (FQIS) have been identified as potential contributors to fuel/air combustion hazards as well as FQIS indication errors and malfunctions. Initial analyses of the residues removed from aircraft parts determined that the residues were heterogeneous mixtures containing varying levels of silver, copper, and organic components. Part I of the research focused on identifying the effects of exposed metal surfaces, fuel chemistry, and electrical fields on the formation of conductive deposits on electrical connections. It was determined that simple laboratory experiments combining electrical currents with silver surfaces (wires/plated nuts), water and lower sulfur (below 150 ppm sulfur) fuels could be used to produce conductive deposits with chemical and electrical properties similar to the residues removed from fuel tank components. The capabilities of the prepared conductive residues to initiate fuel/air combustion were then studied in Part II of this research.