EI research report

Review of methods of bonding a hydrant servicer (dispenser) to an aircraft for refuelling

REVIEW OF METHODS OF BONDING A HYDRANT SERVICER (DISPENSER) TO AN AIRCRAFT FOR REFUELLING

EI RESEARCH REPORT

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FOREWORD

This research report was commissioned by the Energy Institute's Aviation Committee, in consultation with the API Aviation Technical Services Sub-Committee, to provide expert analysis and opinion on the methods that are currently employed to bond a hydrant servicer (dispenser) to an aircraft for refuelling.

It is hoped and anticipated that this publication will provide information for those involved in aircraft fuelling operations. Every effort has been made by the Energy Institute to assure the accuracy and reliability of the data contained in this publication; however, EI makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaim any liability or responsibility for loss or damage resulting from its use or for the violation of any local or regional laws or regulations with which this publication may conflict.

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EXECUTIVE SUMMARY

This report was commissioned by the EI to provide a technical review of the electrical bonding of aircraft to fuelling equipment, in particular the sequence that is followed for the connection of hoses between the fuelling vehicle and the hydrant and the fuelling vehicle and the aircraft, and the bonding wire between the vehicle and aircraft.

The report documents the differences that exist in the guidance provided in publications from several standard development organisations and industry associations.

An evaluation is presented of the different methods that are specified for the bonding of fuelling equipment to aircraft, with specific emphasis on minimising the risk of ignition of fuel (liquid or vapour) due to electrostatic charge sources and differences in potential between an aircraft fuelling equipment.

The assessment determined that it is only if the vehicle is not grounded through its tyres and the floor (apron) but the aircraft is grounded, that there is any difference in risk between the bonding sequences that could be followed. In that case it provides a marginal safety advantage to bond the vehicle to the aircraft first before coupling any hoses from the vehicle (to either the hydrant or the aircraft).

The assessment also highlights that if neither the vehicle nor the aircraft is grounded through their tyres and the floor (apron) there is a risk that the vehicle and hydrant could be at different voltages prior to connection of the intake hose from the vehicle to the hydrant pit valve, irrespective of whether the vehicle is connected first to the aircraft or the hydrant. This emphasises the importance of a low resistance material such as concrete being used with no insulating coatings for the apron, and the combined resistance from the vehicle chassis through tyres to ground not exceeding $10^8\Omega$.

The EI Aviation Committee and API Aviation Technical Services Sub-committee concur with the findings of this report and recommend that the first step in a fuelling procedure should be to connect the bonding wire from the fuelling vehicle to the aircraft (procedure B from Table 2).