

El Research report

Aviation fuelling hazardous area classification

EI RESEARCH REPORT

AVIATION FUELLING HAZARDOUS AREA CLASSIFICATION

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FOREWORD

This EI Research Report has been prepared by Andrew Garrison and Steve Sherwen of RPS Risk Management¹ under the direction of the Energy Institute's (EI) Aviation Committee.

This work was commissioned to provide an authoritative hazardous area classification for aviation fuelling with jet fuel and to propose internationally-acceptable direct examples. This was in recognition that there is a large degree of standardisation in aviation fuelling vehicle design (hydrant dispensers, refuellers and hydrant carts) and that of vehicle-mounted service equipment.

The intention of this work was to achieve consensus agreement on a subject that has been debated for many years, with a wide range of regional and national interpretation, due to the relatively high flashpoint of jet fuel (well above ambient in temperate zones) and lack of quantitative data on mist/spray formation.

This EI Research Report is intended to assist all those involved in the design, construction, inspection and maintenance of aviation fuelling vehicles and all companies involved in the fuelling of commercial aircraft with jet fuel.

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API (Figure 6)
 Health and Safety Laboratory (Figure 5)
 IATA (Figure 17)
 Standards Australia/Standards New Zealand (Figure ZA.25)

Project coordination and editing was undertaken by Martin Hunnybun (EI).

1 INTRODUCTION

The EI Aviation Committee has identified a need to standardise the classification of potentially hazardous zones around commercial jet aircraft fuelling across the world.

RPS was given the task of providing technical assistance to support the preparation of Hazardous Area Classification (HAC) guidance on the potentially flammable zones that may exist around jet aircraft fuelling operations.

The following sections follow the review of existing technical information on the HAC of aircraft refuelling and then provide guidance for the size and nature of zones, using the format of the direct examples given in EI 15 4th Edition. The zones and their hazardous extents are taken from the literature reviewed and applied pragmatically to reflect the nature and working environment of the aircraft fuelling equipment.

This publication has been created with Jet A-1/Jet A as the process fluid. If an aircraft's fuel tanks are filled with lower flash point fuels (e.g. TS-1 or AVGAS) then spills and vent vapours will have a higher risk of ignition and a specific study must be carried out to determine the extent of any hazardous zone.

2 METHODOLOGY

RPS had an initial meeting on 24 March 2016 with the EI Aviation Committee where information was gathered on aircraft refuelling operations and vehicles. RPS was shown dispenser and refueller equipment located at the ASIG facility and then witnessed an aircraft being refuelled by a dispenser at Manchester Airport to aid in their understanding of the process and the potential sources of release.

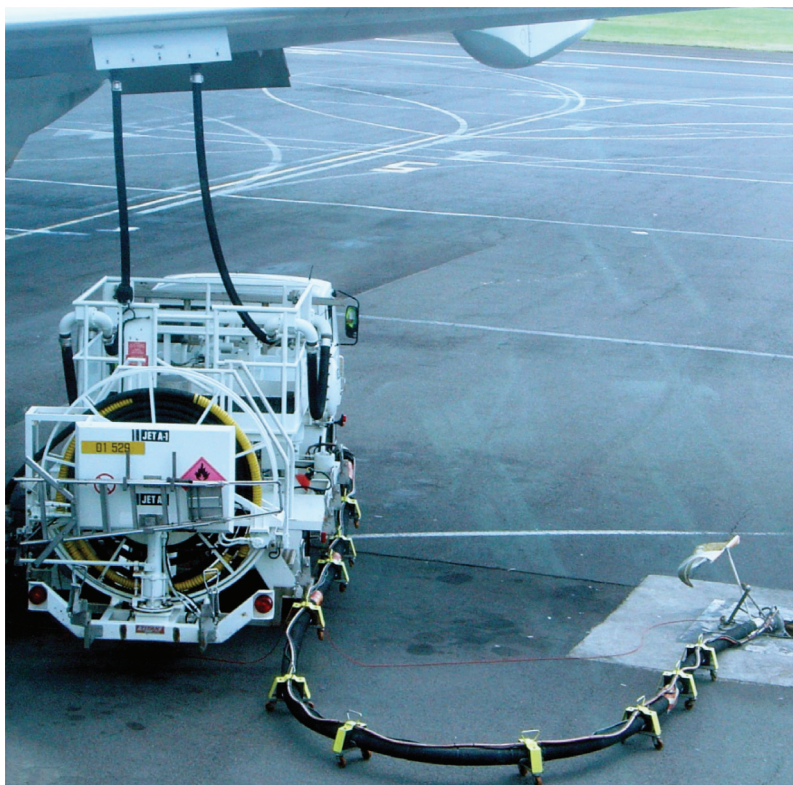


Figure 1: A fuel dispenser fuelling an aircraft

RPS then conducted a technical review of available literature and documentation which was supplied by the EI Aviation Committee. The following operations were considered in the development of the HAC:

- in position ready to perform the fuelling operation;
- performing the fuelling operation, and
- in standby with no connections made to a hydrant or aircraft.

Following this technical review RPS presented its findings to the Aviation Committee at a meeting of the working group in Prague on 19 May 2016. Here RPS proposed the options for direct examples for the operations listed here. During the meeting the opinion was taken to construct a set of worldwide direct examples which could be applied to any aircraft refuelling operations, independent of the ambient temperature. Acceptance was gained and technical feedback given.