EI 1592

Design, functional requirements and laboratory testing protocols for electronic bulk water detectors for use in aviation fuelling

energy institute

EI 1592:
DESIGN, FUNCTIONAL REQUIREMENTS AND LABORATORY TESTING PROTOCOLS FOR ELECTRONIC BULK WATER DETECTORS FOR USE IN AVIATION FUELLING

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CONTENTS

Page

Legal notices and disclaimers. 5

Foreword 6

Acknowledgements 7

1 Introduction and scope 8
1.1 Introduction 8
1.2 Scope 8

2 Application 9
2.1 Materials of construction 9
2.2 Temperature range 9
2.3 Flow rate and pressure 9
2.4 Other design requirements 10

3 Electrical installation 12

4 Installation 13

5 Minimum performance requirements 14
5.1 Free water detection 14
5.2 Information processing, information display and output signal. 14
5.3 Recovery time/equipment reset 14
5.4 System check. 14

6 Drawings, certificates and operating manual 15

Annexes

Annex A Laboratory performance testing 16
A.1 Introduction 16
A.2 Test protocol hardware 16
A.2.1 Rig design. 16
A.2.2 Flow apparatus 16
A.2.3 Sampling probes 17
A.2.4 Fuel tanks 17
A.2.5 Pumping unit 17
A.2.6 Slug of water test facility. 17
A.3 The mounting of candidate detectors in the 'test bench' 18
A.4 Qualification test materials 19
A.4.1 Test fuel 19
A.4.2 Test fuel temperature 19
A.4.3 Test contaminants 19
A.4.4 Additives. 19
A.5 Detector installation and data collection 19

Contents continued

Page

A.6 Fuel preparation . . . 20
A.7 Pre-test supporting measurements . . . 20
A.8 Test protocol . . . 21
A.8.1 Overview . . . 21
A.8.2 Test procedures . . . 22
A.9 Test report format . . . 22

Annex B Mechanical integrity testing procedures . . . 24
B.1 General . . . 24
B.2 Proof pressure . . . 24
B.3 Hydrostatic vacuum test . . . 24
B.4 Burst pressure . . . 24

Annex C Demonstrating compatibility of equipment material(s) and fuel . . . 25
C.1 Material assessment . . . 25
C.2 Compatibility testing . . . 25

Annex D Bibliography . . . 26

Annex E Abbreviations/units . . . 28
E.1 Abbreviations . . . 28
E.2 Unit conversion factors . . . 28

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FOREWORD

This publication has been prepared by the Energy Institute's Aviation Committee. It is intended to provide minimum design and functional requirements, and laboratory testing protocols for electronic bulk water detectors for use in aviation fuelling.

The minimum performance verification tests of bulk water detectors when exposed to jet fuel containing free water are intended for First Article Testing only. The inclusion of such tests is intended to provide a means for manufacturers to demonstrate, under controlled laboratory conditions, selected aspects of the performance of their equipment. The tests should in no way be taken as the only aspects of performance that a user should investigate prior to the routine use of such equipment in their operations. An electronic sensor that is subjected to the laboratory performance verification tests should not be represented by a manufacturer as being 'fit-for-purpose' in aviation fuelling operations on the sole basis of such test results. The limitations of laboratory testing should be fully appreciated by manufacturers and users of bulk water detectors. It is not possible to replicate exactly in a laboratory the parameters to which a bulk water detector would be exposed when in service in commercial aircraft fuelling applications.

The use of bulk water detectors that meet the requirements of EI 1592 alone cannot provide assurance that fuel delivered to aircraft will meet minimum quality requirements. It is envisaged that bulk water detectors will be used in conjunction with a recognised means of fuel filtration. Bulk water detectors that meet the requirements of EI 1592 are intended to be part of a comprehensive system to protect aviation fuel cleanliness/quality. They cannot be regarded as fail-safe devices on their own. It is not necessarily intended that bulk water detectors that meet the design requirements of this publication alone will be suitable for their intended application.

Any manufacturer wishing to offer a bulk water detector stated to comply with this publication is responsible for complying with all the mandatory provisions included herein. It is the responsibility of the manufacturer to further define any application and/or performance limitations that affect the serviceability of a bulk water detector in aircraft servicing.

Suggested revisions are invited and should be submitted to the Technical Department, Energy Institute, 61 New Cavendish Street, London, W1G 7AR (e: technical@energyinst.org).

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1 INTRODUCTION AND SCOPE

1.1 INTRODUCTION

The aviation fuel supply industry operates stringent quality control processes during fuel handling operations to ensure that all aviation fuel supplied to aircraft is within prescribed parameters of cleanliness, in accordance with the relevant fuel quality surveillance specification. Fuel filtration systems are used extensively to maintain fuel cleanliness, with several different types of filtration systems commonly adopted at airports.

This publication provides electronic bulk water detector manufacturers/suppliers and users with a basis for developing a specification for one component of the aviation fuel handling system that can respond to the presence of a bulk quantity of free water in fuel in flowing conditions.

This publication has been developed to apply to bulk water detectors that could be used on mobile into-plane fuelling equipment in the product flow path positioned upstream of filtration equipment. Bulk water detectors can be used in other applications upstream of mobile into-plane fuelling equipment. Note: Bulk water detectors should not be considered as a replacement for filtration and should only be used in conjunction with recognised aviation filtration systems.

Electronic bulk water detectors are envisaged to be relatively simple insertion-type probes that can provide a 'go' or 'no-go' signal during aircraft fuelling, the 'no-go' alarm condition being activated in response to a bulk quantity of free water in the line.

This publication is intended to apply to any form of detection technology offered for consideration by users.

1.2 SCOPE

This publication applies to equipment for:

– The detection of a bulk quantity of free water[1] in flowing aviation fuel.
– Commercial/civilian fuelling applications[2] (including those utilising fixed cabinets, hydrant dispensers, hydrant carts or refuellers).
– Applications that may handle fuel containing approved additives.
– Use with jet fuel or aviation gasoline.

Excluded from the scope of this publication are electronic sensors that attempt to quantify free water content of aviation fuel. For further information on those sensors see EI 1570 *Handbook on electronic sensors for the detection of particulate matter and/or free water during aircraft refuelling* and EI 1598 *Design, functional requirements and laboratory testing protocols for electronic sensors to monitor free water and/or particulate matter in aviation fuel*.

1 'Bulk water' or '100 % water' or 'water slug' refers to all of the fuel at a single point in a line having been displaced by free water. In the timescales involved in laboratory testing and in field use the system will not be exposed to bulk water for so long that all traces of jet fuel are removed, so there will remain an amount of jet in the bulk water slug. Devices that cannot detect bulk water in the presence of trace amounts of jet fuel are not suitable for this application.

2 The surfactancy of military additives is known to have an effect on water dispersions in jet fuel. This effect and military additives have not been investigated in the development of the test protocols in Annex A.