EI 1594

Initial pressure strength testing of airport fuel hydrant systems with water

3rd edition

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FOREWORD

This third edition of this publication has been produced by the Energy Institute's (EI) Aviation Committee to provide guidance for the initial pressure strength testing, using water as the test liquid, of new fuel hydrant systems. It may also be applied to testing extensions to existing systems where positive isolation can be achieved between the extension and the existing or operational part of the system.

It is not intended to document precise testing procedures, as these will follow the established practices of the companies involved in the test as well as statutory procedures applicable locally. The main aim of the publication is to recommend methods of dewatering and drying after testing the system with water.

The EI is not undertaking to meet the duties of employers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations under local and regional laws and regulations.

Although it is hoped and anticipated that this publication will assist those responsible for designing, constructing, commissioning, operating and maintaining aviation fuel handling systems, the EI cannot accept any responsibility, of whatever kind, for damage or loss, or alleged damage or loss, arising or otherwise occurring as a result of the application of the guidance contained herein.

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

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Project co-ordination and editing was undertaken by Martin Hunnybun (EI).

1 INTRODUCTION AND SCOPE

1.1 INTRODUCTION

1.1.1 Traditionally, most airport fuel hydrant systems were pressure strength tested using jet fuel as the introduction of water was considered to be detrimental to quality assurance requirements. As environmental considerations became more stringent, some organisations prohibited the use of jet fuel as the test liquid when carrying out the initial pressure strength testing of the system.

1.1.2 Further, when using jet fuel as the test liquid, it has been noted that unpredictable results may be experienced, particularly in the early stages of the test when a drop in pressure can be experienced which may or may not be as a result of a leak. Research commissioned by the EI[1] has shown that air absorption into jet fuel was mainly responsible for the anomalous results experienced in the field. Carrying out the same tests using water gave much more stable results even if some air was present in the system. One of the conclusions of the research was that the use of water as the test medium produces reliable pressure test results.

1.1.3 This publication is intended to give guidance to designers, engineers and operators of airport fuel hydrant systems in the use of water for testing and, in particular, the subsequent dewatering procedures required in bringing the system into commission. Whilst such operations/procedures are commonplace in other sectors of the pipeline industry, in the past they were not generally adopted in the testing of airport fuel hydrant systems.

1.1.4 Since the first edition of EI 1594 in 2001, the industry has gained experience in cleaning and drying airport fuel hydrant systems after water has been used for the initial pressure strength test. Thorough drying of the hydrant system following testing with water is essential to ensure that the system, when in service, will not affect the cleanliness of the fuel within it.

1.1.5 It is essential to remove as much of the water as possible by draining and pigging, as water remaining in the system that is subsequently evaporated by vacuum and/or air drying may leave deposits of scale and calcium, particularly in areas where hard water is used.

1.1.6 Initial pressure strength testing of hydrant systems, and the procedures recommended in this publication, are non-routine activities that require detailed and thorough planning beforehand, including the preparation of a detailed Method Statement, Risk Assessment Analysis, and the use of a Permit-to-Work system throughout the operation. Planning should also address the provision of adequate equipment and resources for the operation, including contingency arrangements.

1.2 SCOPE

1.2.1 The guidance included in this publication applies to the initial pressure strength testing of a new hydrant system, or of extensions to existing hydrant systems, including dewatering and drying procedures.

1 EI *Research report: Report on a study into pressure effects on liquid kerosene*. Available from the EI library.

1.2.2 The guidance in this publication relates only to the underground part of the hydrant system from the final depot flange before the pipework goes underground. This often is the cathodic protection insulating flange. For details of design considerations for the above-ground section of the system, see EI 1540 *Design, construction, operation and maintenance of aviation fuelling facilities*.

1.2.3 Supply lines, even though they may be run underground for the whole or part of the way from the supply point to airport storage, are considered to be the responsibility of the relative supply and distribution entity. They are not, therefore, included in the scope of this publication.

1.2.4 This publication does not address the use of gas or air for testing hydrant integrity. Gases are less sensitive as a pressure test medium than a liquid and also present a high risk of accident due to the high level of stored energy.