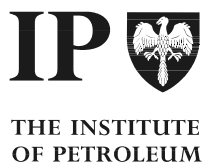


SPECIFICATIONS AND QUALIFICATION PROCEDURES
FOR AVIATION FUEL MICROFILTERS

API/IP SPECIFICATION 1590

Second edition
April 2002



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and
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CONTENTS

	Page
Foreword	vii
Acknowledgements	ix
1 General	1
2 Description	3
3 Specifications	5
3.1 Element performance specifications	5
3.2 Mechanical specification	6
4 Qualification test materials and facilities	11
4.1 Test materials and facilities	11
4.2 Test fuel	11
4.3 Test contaminants	11
4.4 Additive package	12
4.5 Test facility	12
5 Mandatory test procedures	15
5.1 General	15
5.2 Mechanical specification approval	15
5.3 Test fuel preparation	15
5.4 Performance tests	15
Annex A - Unit conversion factors	21
Annex B - Schedule of analytical testing (5.4)	23
Annex C - Laboratory analysis of media migration samples	25
Annex D - Gravimetric membrane analysis and contaminant removal efficiency rating	27

FOREWORD

This is the 2nd edition of this specification. The 1st edition was published by The Institute of Petroleum in 1999. This edition is jointly published by The American Petroleum Institute (API) and The Institute of Petroleum (IP) and has been suitably coded as specification 1590.

This edition of the specification was developed to align API and IP perspectives and clarify certain testing requirements. The test fuel chemistry is changed in this edition to provide alignment with a revision of API/IP 1581 *Specification and qualification procedures for aviation jet fuel filter/separators*, but no changes in element performance requirements between this and the 1st edition of the specification are intended. Equipment qualified to the 1st edition of this specification remains qualified to this edition subject to purchaser's agreement.

This publication describes specifications and qualification test procedures for microfilter elements of the disposable cartridge type and, separately, the manufacturing requirements for new vessels for use in aviation jet fuel-handling systems. It relates only to elements nominally rated within the range 1,0-5,0 μm . This specification provides test conditions and minimum flow rates for microfilter elements having an outside diameter of 150 mm (6 in.). Microfilter elements of other diameters may fall within the scope of this specification when manufacturer and purchaser agree to minimum flow rates and certain test conditions. These specifications are for the convenience of purchasers in ordering, and manufacturers in fabricating, microfilter vessels and elements. They are not in any way intended to prohibit either the purchase or manufacture of microfilter elements meeting other requirements.

Once an element model has been qualified, any change in design or materials voids the qualification of that model. It may not be necessary to conduct all of the performance tests in this specification to re-qualify a modified model depending upon the details of the changes.

The vessel requirements included in this specification refer to new, purpose built microfilter vessels. This specification does not discourage the use of existing vessels, which continue to meet purchasers' needs, regardless of compliance with the mechanical requirements of this specification.

This publication specifies microfilter element performance in terms of single element tests only (no full-scale testing is required). This permits the purchaser maximum flexibility in the application of microfilter elements. Purchasers, however, should be aware that the design and application of full-scale vessels could impact field performance. Users should also be aware that the field performance of microfilters is affected by a number of parameters. For example an additive-containing fuel may subsequently disperse dirt particles collected by a microfilter from an additive-free fuel such that particles are released to the fuel stream.

The American Petroleum Institute and The Institute of Petroleum are not undertaking to meet the duties of employers, manufacturers or suppliers 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.

Nothing contained in any American Petroleum Institute or Institute of Petroleum joint publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

It is hoped and anticipated that this publication will assist both the manufacturers and purchasers of microfilters. Every effort has been made by the American Petroleum Institute and the Institute of Petroleum to assure the accuracy and reliability of the data contained in this publication; however, API and IP make no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims 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.

Suggested revisions are invited and should be submitted to the Manager of Standardization, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005, USA or to the Technical Department, Institute of Petroleum, 61 New Cavendish Street, London, W1G 7AR, UK.

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Parker Hannifin Corporation
Phillips 66 Company
Shell Aviation Ltd.
Shell Global Solutions
Texaco Ltd.
United Airlines
Velcon Filters
Vic Hughes Associates Ltd.

1

GENERAL

- (a) This publication covers the recommended minimum performance, mechanical specifications and the recommended testing and qualification procedures for aviation jet fuel microfilters of four nominal ratings¹ within the range 1,0-5,0 μm .
- (b) The fuel additives included in this specification are for testing purposes only, and their inclusion does not constitute acceptance or rejection of their use in jet fuels.
- (c) This publication uses the Systeme International d'Unites (International System of Units or S.I.). In this system, the decimal point is a comma (.). In writing numbers greater than 3 digits, e.g. thousands, tens of thousands etc. a comma may not be used to demarcate the thousands. Thousands are demarcated by the use of a space. Where necessary, alternative units in common use are given in parentheses. Annex A lists the unit conversion factors used in this specification.
- (d) The following publications are cited in this publication; the latest available edition of each referenced publication applies:
- API/IP²
- 1581 *Specification and qualification procedures for aviation jet fuel filter/separators*
- 1583 *Specifications and qualification procedures for aviation fuel filter monitors with absorbent type elements*
- ASME³
- Boiler and pressure vessel code, Section VIII: Rules for construction of boilers and pressure vessels*
- ASTM⁴
- D 156 *Test method for Saybolt colour of petroleum products (Saybolt chromometer method)*
- D 381 *Test method for existent gum in fuels by jet evaporation*
- D 1094 *Test method for water reaction of aviation fuels*

1 "Nominal rating" is a term used to describe an approximation of the (smallest) size particles captured by filters as defined by the performance tests in this publication. Actual capture efficiency of various size particles is a complex function of many parameters so nominal ratings should not be regarded as implying an absolute level of performance.

2 Available from Portland Press Ltd. Commerce Way, Whitehall Industrial Estate, Colchester, CO2 8HP. Tel: +44(0)1206 796 351, email: sales@portlandpress.com; or API Publications, Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO80112-5776, USA. Tel: 303 397 7956, Fax: 303 397 2740, www.api.org.

3 American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017.

4 ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, USA.

D 1655	<i>Specification for aviation turbine fuels</i>		<i>aviation turbine fuels by line sampling (ASTM D 2276)</i>
D 2276	<i>Standard test method for particulate contaminant in aviation fuel by line sampling</i>	IP 274	<i>Petroleum products - Aviation and distillate fuels - Determination of electrical conductivity (ISO 6297)</i>
D 2624	<i>Test method for electrical conductivity of aviation and distillate fuels containing a static dissipater additive</i>		
D 3240	<i>Test method for undissolved water in aviation fuels</i>	JIG ⁶	<i>AFQRJOS Aviation fuel quality requirements for joint operating systems</i>
D 4177	<i>Standard practice for automatic sampling of petroleum and petroleum products</i>		
IP ⁵		US Military ⁷	
IP 216	<i>Determination of particulate contaminant of</i>	MIL-C-4556	<i>Coating kit, steel tank interior</i>

5 Available to purchase from IP Library, 61 New Cavendish Street, London W1G 7AR, UK. Tel: +44(0)20 7467 7100, email: lis@petroleum.co.uk

6 Aviation Fuel Quality Requirements for Jointly Operated Systems (also known as 'Checklist') published by the 'JIG' (Joint Inspection Group) and available from the Joint Inspection Group, c/o 35 Abercorn Place, London, NW8 9DR, UK.

7 US Military, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120, USA.