

SPECIFICATION FOR SIMILARITY FOR
API/IP 1581 AVIATION JET FUEL FILTER/SEPARATORS

API/IP SPECIFICATION 1582



**Helping You
Get The Job
Done Right.SM**



SPECIFICATION FOR SIMILARITY FOR
API/IP 1581 AVIATION JET FUEL FILTER/SEPARATORS

API/IP SPECIFICATION 1582

February 2001

Published jointly by
American Petroleum Institute
and
The Institute of Petroleum, London
A charitable company limited by guarantee

Copyright © 2001 by American Petroleum Institute, and
The Institute of Petroleum, London:
A charitable company limited by guarantee. Registered No. 135273, England

All rights reserved

No part of this book may be reproduced by any means, or transmitted or translated into
a machine language without the written permission of the publisher.

ISBN 0 85293 282 0

Published by The Institute of Petroleum

Further copies can be obtained from Portland Press Ltd. Commerce Way,
Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: 44 (0) 1206 796 351
email: sales@portlandpress.com

CONTENTS

	Page
Foreword	vii
Acknowledgements	viii
1 Introduction and scope	1
1.1 Introduction	1
1.2 Scope	1
1.3 Referenced publications	1
1.4 Abbreviations	1
1.5 Definitions	1
2 Similarity specification	3
2.1 General	3
2.2 Configuration	3
2.3 Interior geometry	3
2.4 Element layout	3
2.5 Rated flow	5
2.6 Model type	5
2.7 Mean linear flow rate	5
2.8 Liquid entrance velocity	5
2.9 Element/vessel ratios	6
2.10 Simplified flow model	6
3 Simplified flow model methodology	7
3.1 General	7
3.2 Description	7
3.3 SFM method	7
Annex A - Simplified flow model side-by-side configuration	9
Annex B - Simplified flow model end-opposed configuration	15

FOREWORD

This publication, prepared jointly by the Institute of Petroleum Aviation Committee and the American Petroleum Institute Aviation Technical Services Sub-Committee, is intended to provide the industry with a specification for the qualification by similarity of filter/separators used in systems that handle jet fuel.

These specifications are for the convenience of purchasers in ordering, and manufacturers in fabricating, filter/separators. They are not in any way intended to prohibit either the purchase or manufacture of filter/separators meeting other requirements.

Any manufacturer wishing to offer filter/separators conforming to these specifications is responsible for complying with all the mandatory provisions of these specifications.

The Institute of Petroleum and American Petroleum Institute joint publications address problems of a general nature. Local and regional law and regulations should also be reviewed with respect to specific circumstances.

The Institute of Petroleum and American Petroleum Institute are not undertaking to meet 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 Institute of Petroleum and American Petroleum Institute 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.

Although it is hoped and anticipated that this publication will assist both the manufacturers and purchasers of filter/separators, the Institute of Petroleum and the American Petroleum Institute 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 specifications contained herein.

ACKNOWLEDGEMENTS

This publication has been prepared by the API/IP Filtration Sub-Committee on behalf of the Institute of Petroleum and the American Petroleum Institute. Much of the drafting was undertaken by Dennis Hoskin (ExxonMobil Research & Engineering).

Draft versions of this publication were reviewed by representatives of the following companies:

AgipPetroli
Air BP Limited
Air TOTAL
Alan Cobham Engineering Ltd.
BCB Filtration Technology
Caltex Petroleum
Chevron
Conoco Limited
Equilon
ExxonMobil Aviation International Ltd.
Facet International
Faudi Aviation Fuel Filtration GmbH
Faudi UK
Fuel Technology Associates, L.L.C.
Kuwait Petroleum International Aviation Company Ltd.
Pall Corporation
Parker Hannifin Corporation
Service des Armees
Shell Aviation Ltd.
Shell Global Solutions
Texaco Ltd.
United Airlines
USAF
Velcon Filters
Vic Hughes Associates Ltd.

INTRODUCTION AND SCOPE

1.1 INTRODUCTION

Testing to qualify the performance of filter/separator systems is specified in API/IP 1581. A critical performance test specified in API/IP 1581 is the single element test. This is a test of the intrinsic ability of filtration system components to remove dirt and water from jet fuel. A second critical test is the full-scale test. This is a test of the ability of systems of components, which meet single element test criteria, to remove dirt and water under the flow conditions present in commercial-scale systems. Because the scale and complexity of full-scale testing place significant demands on testing resources, it is desirable to minimize the number of full-scale tests required to qualify a range of vessels and filter/separators.

Similarity is the methodology developed to minimize the number of full-scale tests. The concept is that full-scale testing is not needed if a candidate filtration system can be shown to be sufficiently similar to a system already qualified (by full-scale testing) to support the expectation that full-scale testing would meet API/IP 1581 requirements. Such a system is said to be "qualified to API/IP 1581 by similarity".

1.2 SCOPE

This publication specifies the minimum requirements for a filter/separator system to qualify to API/IP 1581 by similarity.

This publication applies to two-stage (filter and separator) and the filter/separator stages of multi-stage

filter/separator systems. This publication does not apply to monitor and/or prefilter stages that may be present in multi-stage systems.

1.3 REFERENCED PUBLICATIONS

The following publications are cited in this publication, the latest available edition of each referenced publication applies:

API/IP 1581 *Specification and qualification procedures for aviation jet fuel filter/separators*

1.4 ABBREVIATIONS

The following abbreviations are used within this publication:

ft/sec	feet per second
gpm	U.S. gallons per minute
lps	litres per second
m/sec	metres per second

1.5 DEFINITIONS

The following terms are used within this publication:

$\Sigma S_{Ac}/A_{cv}$ the ratio of the sum of the effective (without end caps) surface areas of all elements to the inside cross-sectional area of the vessel.