
**Aerospace series — Hydraulic filter
elements — Test methods —**

**Part 1:
Test sequence**

*Série aérospatiale — Éléments filtrants hydrauliques — Méthode
d'essais —*

Partie 1: Séquence d'essais



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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

ISO 14085-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 10, *Aerospace fluid systems and components*.

ISO 14085 consists of the following parts, under the general title *Aerospace series — Hydraulic Filter elements — Test methods*:

- *Part 1: Test sequence*
- *Part 2: Conditioning*
- *Part 3: Filtration efficiency and retention capacity*
- *Part 4: Verification of collapse/burst pressure rating*
- *Part 5: Resistance to flow fatigue*
- *Part 6: Initial cleanliness level*

Introduction

In aerospace hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure. The liquid is both a lubricant and power-transmitting medium. The presence of solid contaminant particles in the liquid interferes with the ability of the hydraulic fluid to lubricate and causes wear and malfunction of the components. The extent of contamination in the fluid has a direct bearing in the performance, reliability, and safety of the system, and needs to be controlled to levels that are considered appropriate for the system concerned.

Filters are used to control the contamination level of the fluid by removing solid contaminant particles, typically consisting of a filter element enclosed in a filter housing. The filter element is the porous device that performs the actual process of filtration. The complete assembly is designated as a filter.

Filter element performance is measured by testing, and a series of International Standards have been developed to quantify performance under specified conditions (see [Clause 2](#)). To provide a greater level of assurance for a filter element's fitness for duty, a verification test program is intended to be based on most of these International Standards. This test sequence has been developed to fulfill that requirement.

The purpose of this part of ISO 14085 is to define a sequence of testing and provide guidelines for acceptance criteria.

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Aerospace series — Hydraulic filter elements — Test methods —

Part 1: Test sequence

1 Scope

This part of ISO 14085 specifies a test sequence for evaluation of characteristics of the hydraulic fluid filter elements under standard conditions.

This part of ISO 14085 is not intended to qualify a filter element under replicate conditions of service; this can only be done by a specific test protocol developed for the purpose, including actual conditions of use, for example the operating fluid or contamination.

The tests data resulting from application of this part of ISO 14085 can be used to compare the performance of aerospace hydraulic filter elements.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2942, *Hydraulic fluid power — Filter elements — Verification of fabrication integrity and determination of the first bubble point*

ISO 5598, *Fluid power systems and components — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

4 Test equipment and materials

Test equipment and material are those specified in each individual part of this International Standard.

5 Accuracy of measuring instruments and test conditions

Accuracy of measuring instruments and test conditions are described in each individual part of this International Standard.

6 Test sample

The filter elements selected for the evaluation testing shall be representative production stock of the same part number and date of build and/or manufacturing lot.

Select at least three filter elements, as some of the tests are destructive and the elements cannot be used for further testing following these tests.

7 Summary of information required prior to testing

Prior to applying the requirements of this part of ISO 14085 to a particular hydraulic filter element, establish the fabrication integrity bubble point (BP) value specified by the manufacturer as per ISO 2942.

8 Test methods

8.1 1st step — Fabrication integrity test and 1st bubble point value

Verify the fabrication integrity of each of the three filter elements in accordance with ISO 2942 and disqualify from further testing any filter elements failing to comply with the fabrication integrity value.

NOTE In the instance of disqualification of any of the three filter elements, replace the filter element with another of the same part number and issue.

Record the pressure value at which the first bubble stream occurs for each filter element tested. For those that fail the minimum bubble point, designate as "Fail < x Pa", where x is the minimum value.

Dry the filter elements.

CAUTION — Take care when drying elements that have been tested using a volatile solvent because of potential explosion and vapor inhalation risks. Comply with local health and safety regulations and use good laboratory practice.

8.2 2nd step — Identification and marking

Sort the elements that have passed the criteria in [8.1](#) in accordance with their 1st bubble point value.

- a) 1st element: lowest bubble point.
- b) 2nd element: highest bubble point.
- c) 3rd element: middle bubble point.

Mark the filter elements in a suitable location and using a suitable method, ensuring that the identification marks chosen do not conflict with other markings on the filter elements, and will not come off.

8.3 3rd step — Test sequence

The tests shall be performed on the three filter elements. Perform the test sequence as described in [Figure 1](#), [Figure 2](#) and [Figure 3](#).

A test on an element can only be continued if the previous test was successful.

In the case of the first filter element (lowest bubble point), the collapse/burst test need only be performed if the collapse/burst differential pressure requirement is greater than the differential pressure used in the conditioning test.

The order of testing of the filter elements shall be selected by the test laboratory.

Each set of tests can be performed independently.

9 Data presentation

Present all results of each test in the format proposed in the relevant test method.

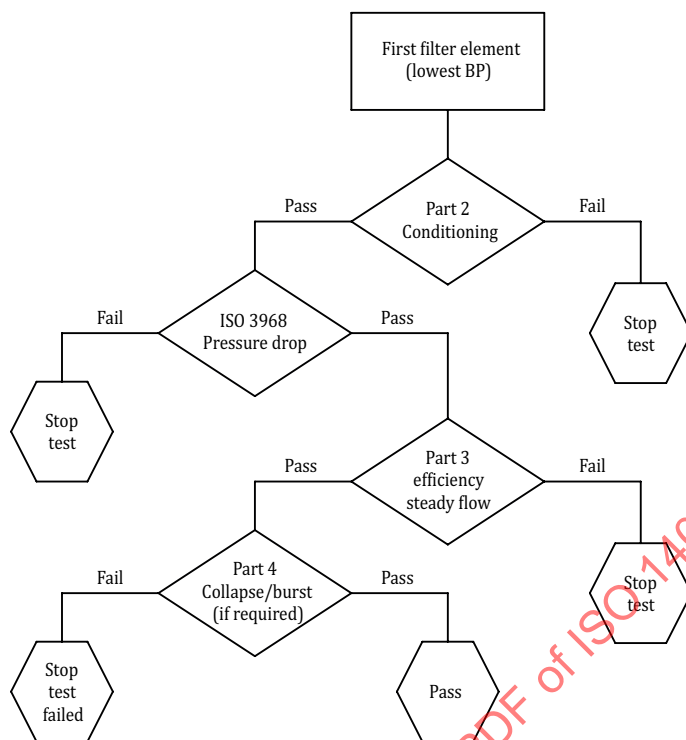


Figure 1 — First filter element test sequence

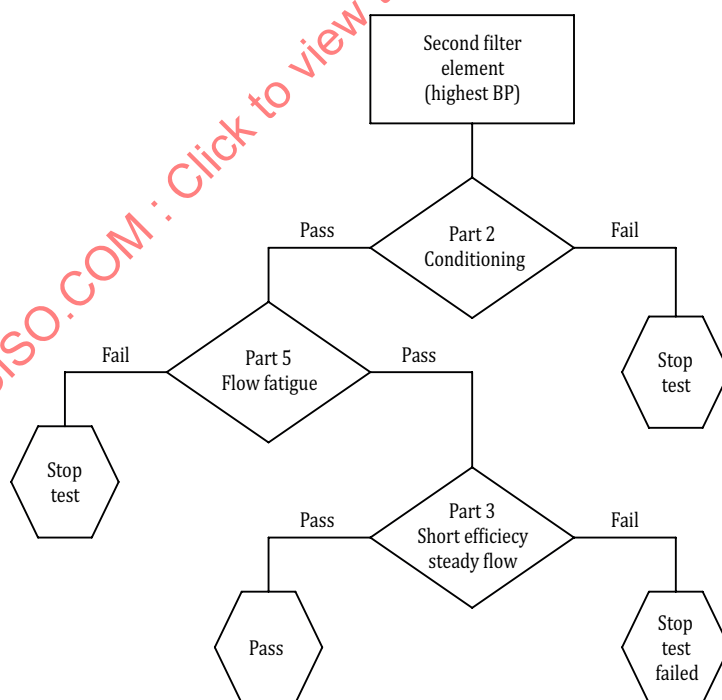


Figure 2 — Second filter element test sequence

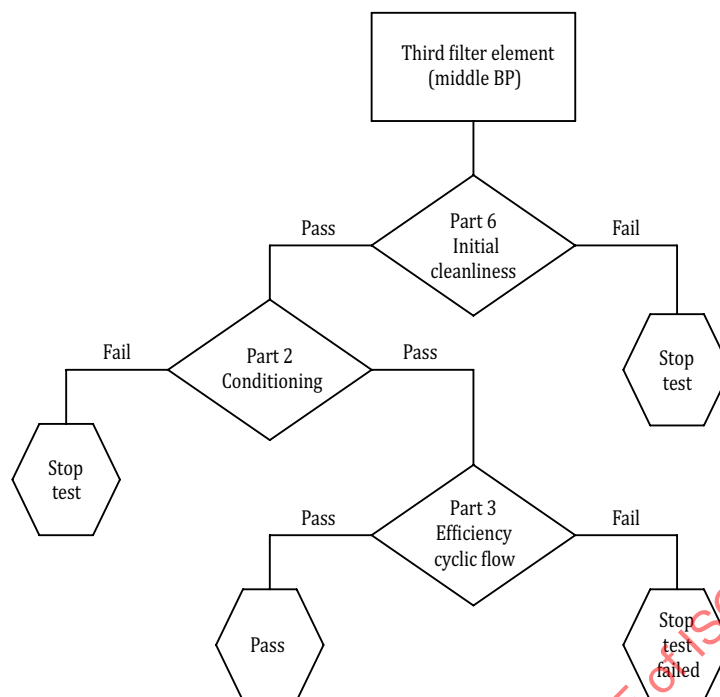


Figure 3 — Third filter element test sequence

10 Acceptance criteria or data to be reported

See [Table 1](#) for acceptance criteria or data to be reported.

Table 1 — Summary of tests performed and acceptance criteria or data to be reported

Test method	Reference standard	1st Filter Element		2nd Filter Element		3rd Filter Element	
Bubble point	ISO 2942	Pass/fail	Value:	Pass/fail	Value:	Pass/fail	Value:
Conditioning	ISO 14085-2	Pass/fail		Pass/fail		Pass/fail	
Pressure drop	ISO 3968	Pass/fail	Value:				
Efficiency - steady flow	ISO 14085-3	Pass/fail	Value:	Pass/fail	Value:		
Retention capacity	ISO 14085-3	Pass/fail	Value:				
Burst/collapse	ISO 14085-4	Pass/fail					
Flow fatigue	ISO 14085-5			Pass/fail			
Cleanliness level	ISO 14085-6					Pass/fail	Value:
Efficiency - cyclic flow	ISO 14085-3					Pass/fail	Value:

11 Identification statement

Use the following statement in test reports, catalogues, and sales literature when electing to comply with this part of ISO 14085:

“Filter element test sequence in accordance with ISO 14085-1, *Aerospace series — Hydraulic Filter elements — Test methods — Part 1: Test sequence*”