



SURFACE VEHICLE STANDARD

J2312™

JUN2021

Issued 2005-04
Revised 2021-06

Superseding J2312 MAY2013

Automatic Transmission Intake Filter Test Procedure

RATIONALE

This document has been revised for clarity, simplification, and inclusion of the latest advances in transmission intake filter validation testing.

1. SCOPE

This test procedure is intended to apply to hydraulic pump suction filters and strainers used in automotive automatic transmissions that include hydraulic power pumps. The various paragraphs of Section 5 include a variety of tests and alternative tests that are not applicable to all filters and applications, so the engineer must specify which tests are to be performed for a particular application. These test procedures are intended to evaluate filter functional performance characteristics only, durability is not evaluated under this standard.

Filter design requirements must be specified by the engineer on the filter assembly drawing, an applicable engineering specification, or summarized on an application data sheet similar to that found in this recommended practice. See Figure 6.

Pressure circuit filters, both barrier and system contamination control types, are not covered under this standard. They are similar in design and construction to filters used in many hydraulic and lubricating applications. Testing for pressure filters are covered by the ISO and SAE standards listed under references in Section 2.

1.1 Purpose

The purpose of this standard is to establish test methods to evaluate critical performance characteristics of automatic transmission intake (suction) filters. These filters need ratings for flow capacity, temperature range, contaminant capacity, filter efficiency, and other critical functional characteristics. These characteristics should be representative of a production feasible design and are to be applied to the filter assembly. Pressure side filters are covered by other existing test standards and practices.

Prior use of “nominal” and “absolute” filter ratings as applied to a filter’s ability to capture particles of a given size have been deprecated. This standard predicates the use of “filtration ratios” (efficiency) or “beta ratios” to describe the capture effectiveness under reproducible test conditions using a known test contaminant.

SAE Executive Standards Committee Rules provide that: “This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user.”

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2021 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

For more information on this standard, visit
https://www.sae.org/standards/content/J2312_202106

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE HS-806-2009, SAE Oil Filter Test Procedure ISBN 978-0-7680-2155-4, Discontinued, limited availability.

2.1.2 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 1219-1	Fluid Power Systems and Components - Graphic Symbols and Circuit Diagrams - Part 1: Graphic Symbols for Conventional Use and Data Processing Applications
ISO 3722	Hydraulic Fluid Power - Fluid Sample Containers - Qualifying and Controlling Cleaning Methods
ISO 3724	Hydraulic Fluid Power - Filter Elements - Determination of Resistance to Flow Fatigue Using Particulate Contaminant.
ISO 3968	Hydraulic Fluid Power - Filters - Evaluation of Pressure Drop Versus Flow
ISO 4021	Hydraulic Fluid Power - Particulate Contamination Analysis - Extraction of Fluid Samples from Lines of Operating Systems
ISO 4405	Hydraulic Fluid Power - Fluid Contamination - Determination of Particulate Contamination by Gravimetric Method
ISO 4406	Hydraulic Fluid Power - Method of Coding Level of Contamination by Solid Particles
ISO 5598	Fluid Power Systems and Components - Vocabulary
ISO 11171	Hydraulic Fluid Power - Calibration of Automatic Particle Counters for Liquids
ISO 11841-1	Road Vehicles and Internal Combustion Engines - Filter Vocabulary - Part 1: Definitions of Filters and Filter Components
ISO 11841-2	Road Vehicles and Internal Combustion Engines - Filter Vocabulary - Part 2: Definitions of Characteristics of Filters and Their Components
ISO 11943	Hydraulic Fluid Power - On-Line Liquid Automatic Particle Counting Systems - Method of Calibration and Validation
ISO 12103-1	Road Vehicle - Test Dust for Filter Evaluation - Part 1: Arizona Test Dust
ISO 16889	Hydraulic Fluid Power - Filters - Multi-Pass Method for Evaluating Filtration Performance of Filter Elements
ISO 16232	Road Vehicles - Cleanliness of Components and Systems

2.1.3 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-H-5606J Performance Specification - Hydraulic Fluid, Petroleum Base: Aircraft and Ordnance

MIL-DTL-8815D W/ Attachment 2 Filter and Filter Elements, Fluid Pressure, Type II Systems, General Specifications

2.1.4 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM MNL32-5th Test Sieving Methods : Guidelines for Establishing Sieve Analysis Procedures, 5th Edition

ASTM C778-17 Standard Specification for Standard Sand

2.2 Other Publications - General Information References

2.2.1 Eleftherakis, J. and Khalil, A., "Advanced Filter Test Methods - Utilizing the Multi-Pass Test," TAPPI Press, 1993.

2.2.2 Eleftherakis, J. and Khalil, A., "Development of a Laboratory Test Contaminant for Transmissions," SAE Technical Paper 900561, 1990, <https://doi.org/10.4271/900561>.

2.2.3 Eleftherakis, J. and Khalil, A., "Test Methods for Automotive Filtration," SAE Technical Paper 930016, 1993, <https://doi.org/10.4271/930016>.

2.2.4 Hummel, P., "Advancements in Automotive Transmission Sump Filtration," SAE Technical Paper 960535, 1996, <https://doi.org/10.4271/960535>.

2.2.5 Chapter 14 in "Design Practices: Passenger Car Automatic Transmissions," (Warrendale, SAE International, 2012), doi:10.4271/AE-29.

2.2.6 Khalil, A., Eleftherakis, J., Parnell, D., Bill, P. et al., "Advances in Automatic Transmission Cleanliness," SAE Technical Paper 2001-01-0372, 2001, <https://doi.org/10.4271/2001-01-0372>.

3. TERMS AND DEFINITIONS

For the purpose of this document, the terms and definitions given in ISO 5598, ISO 11841-1, and ISO 11841-2 together with the following apply.

3.1 FILTER

A device whose primary function is to capture and retain insoluble contaminants from a fluid.

3.2 FILTER COMPONENTS

The parts that make up a filter.

3.2.1 BAFFLE

A device to prevent direct flow impingement or to guide the flow. Can be used inside the filter housing to prevent tunneling and channeling through the media by distributing the flow. When used on the outside of the filter, a baffle can prevent air ingestion during maneuvering or it can be used to guide spent fluid to the filter inlet.