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Hydraulic filter element test methods — Thermal conditioning and cold start-up simulation

Méthodes d'essai des éléments filtrants hydrauliques — Conditionnement thermique et simulation de démarrage à froid

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Foreword

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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).

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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

The committee responsible for this document is ISO/TC 131, *Fluid power systems*, Subcommittee SC 6, *Contamination control*.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within a closed circuit. Filter elements maintain fluid cleanliness by removing insoluble contaminants.

Filter elements, particularly those intended for mobile hydraulic applications, are designed to withstand a range of thermal stresses, such as low and high temperature extremes, and system demands at low temperature (cold starts) whereby hydraulic fluid passes through the element under test at a greatly increased viscosity. These cold starts test the ability of the filter element to withstand the high differential pressures without subsequent loss of integrity or performance.

Stresses due to cold starts can be encountered within the lifetime of a filter element fitted in a mobile hydraulic system. It is therefore necessary to check that, having been subjected to such conditions, the filter element shall continue to provide adequate filtration while also maintaining structural integrity.

This International Standard provides a procedure by which to introduce stresses due to cold start and to condition a filter element prior to any subsequent performance qualification testing, such as multi-pass, collapse, flow fatigue, etc. This enables the purchaser of the filter element to be secure in the knowledge that the product can withstand cold starts and still maintain performance as intended.

Hydraulic filter element test methods — Thermal conditioning and cold start-up simulation

1 Scope

This International Standard specifies a test procedure to thermally condition a hydraulic filter element and simulate cold start, such as that which can be encountered in mobile machinery applications. It is intended to provide a procedure that yields reproducible results and can be used prior to other filter element performance tests, such as those specified in ISO 11170.

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 1219-1, *Fluid power systems and components — Graphical symbols and circuit diagrams — Part 1: Graphical symbols for conventional use and data-processing applications*

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

ISO 2943, *Hydraulic fluid power — Filter elements — Verification of material compatibility with fluids*

ISO 3968, *Hydraulic fluid power — Filters — Evaluation of differential pressure versus flow characteristics*

ISO 4021, *Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system*

ISO 4406, *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*

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

ISO 11500, *Hydraulic fluid power — Determination of the particulate contamination level of a liquid sample by automatic particle counting using the light-extinction principle*

3 Terms and definitions

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

3.1
cold soak
prolonged immersion of a component or part in stationary fluid at 5 °C below the stated minimum temperature of use

3.2
cold start
application of a rapid increase in flow and differential pressure with cold fluid at a high viscosity

3.3
differential pressure
Δp
difference between the tested component inlet and outlet pressure as measured under the specified conditions