

S1.4.4 NEW INTERNATIONAL STANDARD TEST METHODS OF AEROSPACE FILTERS

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Aerospace industry is facing strong challenges to reduce, weight, energy consumption and emissions. Those constraints require improvements, among many others, of fluid power and lubrication systems.

As a consequence, the systems and components are less tolerant to the presence of foreign contaminants in the fluids. Indeed tighter functional clearances and longer service life increase the risk of loss of functionalities/performances and damage. Filters have to be more and more efficient all along their life, both in normal and in exceptional operational conditions. Filter media and filter manufacturers are lead to continuously imagine new solutions: composite materials, new filtering media incorporating nanofibers and new designs.

To test these new filters in conditions simulating more closely their actual operation conditions, new testing protocols are developed by industry and independent filter testing centers.

International aerospace contamination control experts have issued, in 2015, a set of ISO standards dedicated to Hydraulic Filter elements: ISO 14085 Part1 to 6.

A Round Robin Testing is currently being performed to determine the reproducibility of the test method in part 3 “Filtration efficiency and retention capacity”.

Considering that currently there is no comprehensive contemporary standard to specify performance of filter elements utilized in aerospace lubrication systems, the International aerospace contamination control experts have initiated works aiming at specifying a test sequence and applicable procedures for the evaluation of characteristics of filter elements dedicated but not limited to engine lubrication, helicopter transmission gear box, engine power transmission under standard conditions.

The lecture summarizes the work in progress and illustrates applications of these new methods by typical experimental results. A focus is made on the validation of the test equipment and on the calibration of the measuring instruments, highlighting the special case of optical particle counters used to measure the filtration efficiency of a filter element during its life.