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## Impact of changes in ISO fluid power particle counting — Contamination control and filter test standards

*Conséquences des changements survenus dans les normes ISO  
relatives au comptage des particules — Contrôle de la contamination  
et essais de filtres*



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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](http://www.iso.org/directives)).

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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](#).

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

This second edition cancels and replaces the first edition (ISO/TR 16386:1999) which has been technically revised.

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## Introduction

This Technical Report has been prepared as an information document to give users an understanding into the background and implications of a number of new and revised contamination control standards, namely ISO 11171, ISO 11943, ISO 16889 and ISO 4406.

The adoption of four revised and updated contamination control standards, ISO 11171, ISO 11943, ISO 16889, and ISO 4406:1999, has produced significant changes in terms of how solid contamination levels and filter performance are reported.

With ISO 11171, the method of calibrating automatic particle counters (APCs) using AC Fine Test Dust (ACFTD) used since the early 1970s has been replaced by a new method traceable to the USA's National Institute of Standards and Technology. As a result, contaminant particle sizes previously referred to as 2 µm, 5 µm, 10 µm, and 15 µm became 4 µm(c), 6 µm(c), 10 µm(c), and 14 µm(c), respectively, where (c) refers to particle sizing and counting done with an APC calibrated in accordance with ISO 11171.

ISO 11943 is a new standard for calibrating online particle counting systems that are primarily used to evaluate filter performance. With the ISO 16889 filter multi-pass test, which replaces the original ISO 4572 method, ISO Medium Test Dust (ISO MTD) replaces ACFTD as the test dust and the new ISO 11171 traceable particle counter calibration method is used. In ISO 4406:1999, the new calibration method is used, and a new 4 µm(c) size class has been added to the solid contamination code for particle counts made with an automatic particle counter.

These improvements in particle counting and filter testing have a significant impact on contamination control activities. However, it is important to note that there has been no change in the actual contamination levels or in the performance of filters, or their effectiveness in protecting the reliability of components. This Technical Report discusses what the changes are, why they were made, how they impact contamination levels and filter ratings, and how they benefit the industry.