

This is a preview of "ISO 11171:2016". [Click here to purchase the full version from the ANSI store.](#)

Third edition
2016-10-01

Hydraulic fluid power — Calibration of automatic particle counters for liquids

Transmissions hydrauliques — Étalonnage des compteurs automatiques de particules en suspension dans les liquides



Reference number
ISO 11171:2016(E)

© ISO 2016

This is a preview of "ISO 11171:2016". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

This is a preview of "ISO 11171:2016". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Materials and equipment	2
5 Sequence of APC calibration procedures	4
6 Sizing calibration procedure	7
7 Data presentation	13
8 Identification statement	14
Annex A (normative) Preliminary APC check	15
Annex B (normative) Coincidence error procedure	18
Annex C (normative) Flow rate limit determination	23
Annex D (normative) Resolution determination	27
Annex E (normative) Verification of particle-counting accuracy	32
Annex F (normative) Preparation and verification of bottles of secondary calibration suspensions	35
Annex G (informative) APC calibration round robin	38
Annex H (informative) Sample calculations	43
Annex I (informative) Verification of particle size distribution of calibration samples	49
Bibliography	51

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 11171:2010), of which it constitutes a minor revision.

This edition includes the following significant changes with respect to the previous edition:

- 6.8: defining μm equation, Table 3 – revised to show $\mu\text{m}(\text{b})$ and $\mu\text{m}(\text{c})$ to be reported;
- 7.1: revised to show how to report $\mu\text{m}(\text{b})$ and $\mu\text{m}(\text{c})$.

This is a preview of "ISO 11171:2016". [Click here to purchase the full version from the ANSI store.](#)

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. The fluid is both a lubricant and a power-transmitting medium. Reliable system performance requires control of the contaminants in the fluid. Qualitative and quantitative determination of the particulate contaminants in the fluid medium requires precision in obtaining the sample and in determining the contaminant particle size distribution and concentration. Liquid automatic particle counters (APCs) are an accepted means of determining the concentration and size distribution of the contaminant particles. Individual APC accuracy is established through calibration.

This International Standard establishes a recommended standard calibration procedure for determining particle sizing and counting accuracy. The primary particle-sizing calibration is conducted using NIST SRM 2806 suspensions with particle size distribution certified by the United States' National Institute of Standards and Technology (NIST). A secondary calibration method with traceability to NIST uses suspensions of ISO MTD which are independently analysed using an APC calibrated by the primary method. Concentration limits are determined through the use of serial dilutions of a concentrated suspension. Operation and performance limits are also established using this International Standard.