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Microfluidic devices — Interoperability requirements for dimensions, connections and initial device classification

Dispositifs microfluidiques — Exigences d'interopérabilité concernant les dimensions, les connexions et la classification initiale des dispositifs

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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).

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For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 48, *Laboratory equipment*.

This first edition of ISO 22916 cancels and replaces IWA 23:2016, which has been technically revised.

The main changes are as follows:

— the content of IWA 23 was transferred into a standard for the first time;

— the terms and definitions have been removed in the present document and it refers mainly to ISO 10991;

— the rationale behind technical decisions in IWA 23 have been removed from the present document;

— the geometrical pitch dimensions are included in Clause 4;

— the device classification is included in Clause 9;

— further information have been introduced in the present document.

NOTE IWA 23 initiated the standardization effort in microfluidics and presented mainly the terms and definitions, the geometrical pitch rationale and dimensions and the device classification rationale and proposal.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document was developed in response to microfluidics community demand for minimum specifications for interoperability of microfluidics components, since most of the microfluidics products are produced internally with custom dimensions and characteristics.

Microfluidics based diagnostics have been shown over the years to be viable alternatives to conventional macroscale analysis systems, and in some applications provide analytical capabilities which are not possible using macroscale systems. Hence, exploitation of microfluidics will play an important role for next generation of medical devices. However, there are many (potential) applications for microfluidics, and also many technologies and materials being used. This diversity is a problem when it comes to combining microfluidic components. Researchers do not want to spend much time on side issues like correct connection of tooling; they also want to use chips from different suppliers without needing to change their whole experimental setup; and they want their developed products to go as smoothly as possible into production. Providers of analytical services do not want their limited laboratory space cluttered with a multitude of incompatible instruments. Chemical engineers want easy interconnection between pumps, sensors and reactors, and finally, operational managers want a second source for their products. In short interoperability and therefore standardizing the interfaces between them is important.

Another essential requirement for interoperability is standardization of testing. Testing may be partly very application specific, but there are also tests that are to be used cross application, cross technology and cross material; for instance leakage test, burst pressure tests and flow throughput tests. The test protocol is developed considering the material of the chips, the temperature and pressure range of operation. From studies of the products on the market, a number of application classes with specific temperature and pressure ranges have been defined, that will provide the boundary conditions for the tests to be developed. Ultimately, these tests will lead to quicker access to the market.