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Interoperability of microfluidic devices — Guidelines for pitch spacing dimensions and initial device classification

Interopérabilité des dispositifs microfluidiques — Lignes directrices pour les dimensions d'un pas d'espacement et le classement initial de l'appareil

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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

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Foreword

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The committee responsible for this document is the ISO/TMB, *Technical Management Board*.

International Workshop Agreement IWA 23 was approved at a workshop organized by pan European (ENIAC Joint Undertaking) project MFmanufacturing, in association with Deutsches Institut für Normung (DIN). The workshop was held in British Standards Institution (BSI), London, United Kingdom, on 19 April, 2016. The workshop resolutions and contributors are listed in Annexes A and B, respectively.

Introduction

Microfluidics technology plays an important role for next generation devices. In the last few decades, initial R& D investment in academia has led to the generation of a number of spin out companies. Most of the companies that have flourished are microfluidic foundries or suppliers of microfluidic components. However, the track record associated with the success of actual application devices has been disappointing, with only a small handful of products (such as the ink jet printer) reaching commercial success.

The concern surrounding the lack of commercialization with regards to microfluidic devices has been discussed amongst various interested parties and stakeholders within the Microfluidics Consortium (MC). MC is an ad hoc group that offers a forum for discussion amongst interested parties and stakeholders in the microfluidics community. Such discussions led to the identification of several factors that can potentially hinder commercial success of microfluidics devices. This includes the high R&D and manufacturing costs of devices currently sold into a relatively small market [13]. It has been recognized that in order to reduce costs, there is a need to bring manufacturing of microfluidic devices to the same level of maturity and industrialization as electronic devices. This meant the need to mimic some of the standardization initiatives and outputs from the electronic industry in order to not only reduce costs but at the same time increase interoperability, thus promoting plug-and-play. The standardization initiative that had begun in the MC led to the development of several internal documents, such as a guideline on how to design microfluidic devices [14]. The standardization initiative and knowledge base gained through the MC eventually led to the formation of a pan-European project MFmanufacturing consisting of 20 project partners.

In identifying what standards should be proposed, consideration must be given to current market needs and trends. This led MFmanufacturing to develop, implement and analyse a survey (of 134 respondents), in order to identify those items that are in need of standardization to ultimately enhance the commercialization of microfluidic devices. Attention was given to those items that have been identified as being of highest priority, which are

a) terminology of relevance,

b) geometrical specifications on pitch dimensions,

c) device classification.

These items are further discussed in the relevant paragraphs below.