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Mikrofluidika - Slovar (ISO/DIS 10991:2022)

Microfluidics - Vocabulary (ISO/DIS 10991:2022)

Mikrofluidik – Begriffe (ISO/DIS 10991:2022)

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Microfluidics — Vocabulary

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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).

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).

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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 ISO/TC 48, *Laboratory equipment*.

This second edition cancels and replaces the first edition (ISO 10991:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

— change of the title: "Microfluidics — Vocabulary" compared to "Micro process engineering — Vocabulary";

— due to the massive uptake of microfluidic technology in many areas, several terms have been added.

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.

Microfluidics — Vocabulary

1 Scope

This document gives terms and definitions for micro process engineering and microfluidics applied in medical and veterinary diagnostics, chemistry, agriculture, pharmacy, biotechnology and agrifood industry and other application areas.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General terms, relevant to microfluidics

3.1.1
biocompatibility
special quality of some materials allowing them to come into contact with biological materials without changing the materials' bioactivity

3.1.2
biomarker
biological molecule found in blood, other body fluids or tissues that is used to identify a disease or monitor the progression of a disease

3.1.3
classification
method of sorting into categories

[SOURCE: ISO 22935-1:2009, 3.7]

3.1.4
end-user
person or persons who will ultimately be using the *system* (3.1.15) for its intended purpose

[SOURCE: ISO/IEC 19770-5:2015, 3.13, modified – Note 1 to entry has been removed.]

3.1.5
hydrophilic
property of material of molecule characterised by affinity to water established by hydrogen bonding

3.1.6
hydrophobic
property of a surface or molecule that is repelled from a mass of water

[SOURCE: Semi MS006, *Guide for design and materials for interfacing microfluidic systems*]

3.1.7
interested party
stakeholders
person or organization that can affect, be affected by or perceive themselves to be affected by a decision or activity

Note 1 to entry: For *system* see 3.1.15.

[SOURCE: ISO 28007-1:2015, 3.6, modified – Note 1 to entry has been removed.]

3.1.8
interoperability
property permitting diverse systems or components to work together for a specified purpose

[SOURCE: IEC 80001-1:2010, definition 2.11]

3.1.9
macroscale
dimensions of 0.1 millimetres or greater

[SOURCE: Semi MS003, *Terminology for MEMS technology*]

3.1.10
microfluidics
manipulation of fluids that are confined in a small volume with at least one dimension smaller than 1 mm

3.1.11
microscale
scale of dimensions between 0.1×10^{-3} meters to 0.1×10^{-6} meters

3.1.12
miniaturization
making things on a smaller scale

3.1.13
plug and play
denoting or relating to software or devices that are intended to work perfectly when first used or connected, without reconfiguration or adjustment by the user and thereby enable automatic configuration

3.1.14
wettability
ability of a liquid to spread on a specific solid surface

[SOURCE: ISO 472:2013, 2.1607, modified – wording "(such as an adhesive)" delated and Note 1 to entry has been removed.]

3.1.15
system
sub-system
group of interacting microfluidic, optical, mechanical or electrical components

4 General terms in microfluidics

4.1.1
actuating resolution
lowest variation of a physical parameter that can be operated by a *system* (3.1.15)

4.1.2
capacity
flow rate through a pump at its designed conditions

4.1.3
centrifugal microfluidics
sub category of *microfluidics* (3.1.10) utilizing rotation

Note 1 to entry: The fluid flow is mainly controlled by centrifugal-, Euler- and Coriolis- forces.

4.1.4
closed system
system (3.1.15) that uses preloaded manufacturer-specific reagents only

4.1.5
digital microfluidics
sub category of *microfluidics* (3.1.10) where discrete quantities of liquid are manipulated individually over a surface

4.1.6
droplet microfluidics
sub category of *microfluidics* (3.1.10) manipulating discrete quantities of liquid in a continues flow

4.1.7
lab-on-a-chip
LoC
highly integrated, microfluidic *system* (3.1.15) providing analytical or diagnostic functions

4.1.8
open system
system (3.1.15) that requires external supply of reagents

Note 1 to entry: Such an open *system* (3.1.15) needs microfluidic connection(s).

4.1.9
resolution
smallest change in a quantity being measured that causes a perceptible change in corresponding measurement indication

4.1.10
sensing resolution
lowest variation of a physical parameter that can be detected by a sensor

5 Microfluidic flow related terms

5.1.1
actual flow rate
volumetric flow rate of a gas changed to "standardised" conditions of temperature and pressure

5.1.2
capillary force
capillary action
flowing of liquid through a device without external actuators but only by surface tension and adhesive force between liquid and the wetted material

5.1.3
compliance of a fluidic system
increase of a fluidic system's internal volume under the effect of pressure

Note 1 to entry: The compliance of a fluidic *system* (3.1.15) is expressed in volume units per pressure units.

5.1.4
dead-volume
portion of the internal volume of a *system* (3.1.15) that is not part of a continuous flow-path

Note 1 to entry: In this context dead signifies unmoving, stagnant, or un-swept, and expressed in volume units.

5.1.5
fall time
time required for a flow to change from a specified high value to a specified low value

Note 1 to entry: Typically, these values are 10% and 90% of the step height. The fall time is expressed in time units.

5.1.6
final steady state value
average value of the actual flow rate, after the effects of the input transient have faded to a value equal to or below the intrinsic drift and noise

Note 1 to entry: The final steady state flow rate value is expressed in volume units or mass unites over time units.

[SOURCE: SEMI E17-0600, *Guideline for Mass Flow Controller Transient Characterizations Tests*, modified – "flow rate" and mass units added in the Note 1 to entry.]

5.1.7
hold-up volume
volume of fluid required to fill a device before flow is observed at point of interest or at the outlet

Note 1 to entry: The hold-up volume is expressed in volume units such as mm^3 or microliter.

[SOURCE: Semi MS003, *Terminology for MEMS technology*, modified – "units" added in the Note 1 to entry.]

5.1.8
hydrodynamic resistance
ratio of pressure drop over flow rate for a certain component or *system* (3.1.15)

Note 1 to entry: The hydrodynamic resistance is expressed as pressure units per flow rate units.

5.1.9
hydrostatic pressure
pressure that is exerted by a fluid at rest contained within a *system* (3.1.15) due to the force of gravity

Note 1 to entry: The hydrostatic pressure is expressed in pressure units.

5.1.10
internal volume
maximal total available volume comprised within a fluidic component, device or *system* (3.1.15) under normal atmospheric pressure

Note 1 to entry: The internal volume is expressed in volume units such as mm^3 or microliter.

5.1.11
mass flow rate
mass of fluid which passes per unit of time

Note 1 to entry: The mass flow rate is expressed in mass units per time units.

5.1.12
micro pump
miniaturized liquid or gas pumping equipment with *capacity* (4.1.2) of lower than millilitre per minute flow rate

5.1.13
minimal actuating pressure
input pressure required to start moving a fluid through the fluidic component. Expressed in pressure units

5.1.14
pressure drop
difference of pressure between two positions in the flow path. Expressed in pressure units

5.1.15
reaction time
time interval between the moment of set point step change and the moment at which the flow reaches x% of is intended value rise or fall

Note 1 to entry: Typically, x = 10. The reaction time is expressed in time units.

Note 2 to entry: See also Figure 1.

5.1.16
relative flow stability
coefficient of variation
standard deviation of the flow rate divided by the average flow rate. Expressed as a percentage

5.1.17
response time
time interval between the moment of set point step change and the moment at which the flow reaches y% of is intended value of rise or fall

Note 1 to entry: Typically, y = 90. The response time is expressed in time units.

Note 2 to entry: See also Figure 1.

5.1.18
rise time
time required for a flow to change from a specified low value to a specified high value

Note 1 to entry: Typically, these values are 10% and 90% of the step height. The rise time is expressed in time units.

Note 2 to entry: See also Figure 1.

5.1.19
set point
target flow rate value

Note 1 to entry: See also Figure 1.

5.1.20
setting time
time elapsed from the application of an ideal step input to the time at which the output has entered and remained within a specified (error) band

Note 1 to entry: The setting time is expressed in time units.

Note 2 to entry: See also Figure 1.

Note 3 to entry: See 5.1.21

5.1.21
specified (error) band
region between ±x% of the final steady state value or y% of full scale, whichever is greater

Note 1 to entry: See also Figure 1.