

SLOVENSKI STANDARD
oSIST prEN ISO 20776-1:2018
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Preskus občutljivosti povzročiteljev infekcij na delovanje antimikrobno občutljivih naprav - 1. del: Referenčna metoda za preskus aktivnosti in vitro antimikrobnih povzročiteljev na vpliv bakterij pri nalezljivih boleznih (ISO/DIS 20776-1:2018)

Susceptibility testing of infectious agents and evaluation of performance of antimicrobial susceptibility test devices - Part 1: Broth micro-dilution reference method for testing the in vitro activity of antimicrobial agents against rapidly growing aerobic bacteria involved in infectious diseases (ISO/DIS 20776-1:2018)

Labormedizinische Untersuchungen und In-vitro-Diagnostika-Systeme - Empfindlichkeitsprüfung von Infektionserregern und Evaluation von Geräten zur antimikrobiellen Empfindlichkeitsprüfung - Teil 1: Referenzmethode zur Testung der In-vitro-Aktivität von antimikrobiellen Substanzen gegen schnell wachsende aerobe Bakterien, die Infektionskrankheiten verursachen (ISO/DIS 20776-1:2018)

Sensibilité in vitro des agents infectieux et évaluation des performances des dispositifs pour antibiogrammes - Partie 1: Méthode de référence pour la détermination de la sensibilité in vitro aux agents antimicrobiens des bactéries aérobies à croissance rapide impliquées dans les maladies infectieuses (ISO/DIS 20776-1:2018)

Ta slovenski standard je istoveten z: prEN ISO 20776-1

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| | | |
|-----------|---|----------------------------------|
| 11.100.10 | Diagnostični preskusni sistemi in vitro | In vitro diagnostic test systems |
|-----------|---|----------------------------------|

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en

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Susceptibility testing of infectious agents and evaluation of performance of antimicrobial susceptibility test devices —

Part 1:

Broth micro-dilution reference method for testing the in vitro activity of antimicrobial agents against rapidly growing aerobic bacteria involved in infectious diseases

Sensibilité in vitro des agents infectieux et évaluation des performances des dispositifs pour antibiogrammes —

Partie 1: Méthode de référence pour la détermination de la sensibilité in vitro aux agents antimicrobiens des bactéries aérobies à croissance rapide impliquées dans les maladies infectieuses

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37 **Foreword**

38 ISO (the International Organization for Standardization) is a worldwide federation of national standards
39 bodies (ISO member bodies). The work of preparing International Standards is normally carried out
40 through ISO technical committees. Each member body interested in a subject for which a technical
41 committee has been established has the right to be represented on that committee. International
42 organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO
43 collaborates closely with the International Electrotechnical Commission (IEC) on all matters of
44 electrotechnical standardization.

45 The procedures used to develop this document and those intended for its further maintenance are
46 described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the
47 different types of ISO documents should be noted. This document was drafted in accordance with the
48 editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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51 patent rights identified during the development of the document will be in the Introduction and/or on
52 the ISO list of patent declarations received (see www.iso.org/patents).

53 Any trade name used in this document is information given for the convenience of users and does not
54 constitute an endorsement.

55 For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and
56 expressions related to conformity assessment, as well as information about ISO's adherence to the World
57 Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL:
58 www.iso.org/iso/foreword.html.

59 This document was prepared by Technical Committee ISO/TC 212, *Clinical laboratory testing and in vitro*
60 *diagnostic test systems*.

61 This second edition cancels and replaces the first edition (ISO 20776-1:2006), which has been technically
62 revised.

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

- 64 — Revised to a broth micro-dilution only performance document
- 65 — Removal of S,I, R breakpoint definitions and information
- 66 — Moved embedded Tables to Annexes
- 67 — Removed quality control range Table.
- 68 — Updated Table (now Annex B) on solvents and diluents for antimicrobial agents used globally.
- 69 — Updated information on special culture media and method performance for specific currently used
70 antimicrobial agents.

71 A list of all parts in the ISO 20776 series can be found on the ISO website.

72

73 **Introduction**

74 *In vitro* antimicrobial susceptibility tests are performed on micro-organisms suspected of causing
75 disease, particularly if the organism is thought to belong to a species that may exhibit resistance to
76 frequently used antimicrobial agents. The tests are also important in resistance surveillance,
77 epidemiological studies of susceptibility and in comparisons of new and existing agents.

78 Dilution procedures are used to determine the minimum inhibitory concentrations (MICs) of
79 antimicrobial agents for antimicrobial susceptibility testing. MIC methods are used in resistance
80 surveillance, defining identifying wild type phenotypes, comparative testing of new agents, to establish
81 the susceptibility of organisms that give equivocal results in routine tests, for tests on organisms where
82 routine tests may be unreliable and when a quantitative result is required for clinical management. In
83 dilution tests, micro-organisms are tested for their ability to produce visible growth in broth (broth
84 dilution) containing serial dilutions of the antimicrobial agent or on a series of agar plates (agar dilution).

85 The lowest concentration of an antimicrobial agent (in mg/l) that, under defined *in vitro* conditions,
86 prevents the appearance of visible growth of a micro-organism within a defined period of time is known
87 as the MIC. The MIC is a guide for the clinician to the susceptibility of the organism to the antimicrobial
88 agent and aids treatment decisions. Careful control and standardization is required for intra- and inter-
89 laboratory reproducibility of broth MIC tests. The MICs generally span two to three doubling dilutions
90 with a dominant central value.

91 **Broth dilution** is a technique in which containers holding identical volumes of broth with antimicrobial
92 agent solutions in incrementally (usually geometrically) increasing concentrations are inoculated with a
93 known number of micro-organisms.

94 **Broth micro-dilution** denotes the performance of the broth dilution test in micro-dilution trays.

95 The method described in this part of ISO 20776 is intended for the testing of pure cultures of aerobic
96 bacteria that are easily grown by overnight incubation on agar and grow well in standardised micro-
97 dilution trays containing standardised Mueller-Hinton broth (volume of $\leq 200 \mu\text{l}$), which may need to be
98 modified depending on the antimicrobial agent being tested.

99 The broth micro-dilution method described in this part of ISO 20766 is essentially the same as those used
100 in many countries, and as the methods published by the Clinical and Laboratory Standards Institute
101 (CLSI)[1] and the European Committee on Antimicrobial Susceptibility Testing (EUCAST)[2]. These
102 methods are based on those described by Ericsson and Sherris[3].

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104 **Susceptibility testing of infectious agents and evaluation of**
105 **performance of antimicrobial susceptibility test devices — Part 1:**
106 **Broth micro-dilution reference method for testing the *in vitro***
107 **activity of antimicrobial agents against rapidly growing aerobic**
108 **bacteria involved in infectious diseases**

109 **WARNING —** The use of this part of ISO 20776 may involve hazardous materials, operations and
110 equipment. This part of ISO 20776 does not purport to address all of the safety problems associated
111 with its use. It is the responsibility of the user of this part of ISO 20776 to establish appropriate safety
112 and health practices and determine the applicability of regulatory limitations prior to use.

113 **1 Scope**

114 This part of ISO 20776 describes one reference method, broth micro-dilution, for determination of MICs.
115 The MIC may be a guide for the clinician, and reflects the activity of the drug under the described test
116 conditions, by taking into account other factors, such as drug pharmacology, pharmacokinetics, or
117 bacterial resistance mechanisms. This allows categorisation of bacteria as “susceptible” (S),
118 “intermediate” (I), or “resistant” (R). In addition, MIC distributions can be used to define wild type or non-
119 wild type bacterial populations. Although clinical interpretation of the MIC value is beyond the scope of
120 this part of ISO 20776, modifications of the basic method are required for certain antimicrobial agent -
121 bacteria combinations to facilitate clinical interpretation. These modifications are included in a separate
122 Annex of this document. It is necessary to compare other susceptibility testing methods (e.g. disc diffusion
123 or diagnostic test devices) with this reference method for validation, in order to ensure comparable and
124 reliable results.

125 **2 Normative references**

126 There are no normative references in this document.

127 **3 Terms and definitions**

128 For the purposes of this document, the following terms and definitions apply.

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

130 — IEC Electropedia: available at <http://www.electropedia.org/>

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

132 **3.1**

133 **antimicrobial agent**

134 substance of biological, semi-synthetic or synthetic origin that inhibits the growth of or kills bacteria, and
135 is thus of potential use in the treatment of infections

136 Note to entry: Disinfectants, antiseptics and preservatives are not included in this definition.

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137 **3.2 Antimicrobial agents — properties**

138 **3.2.1**

139 **potency**

140 **potency** is a measure of drug activity expressed in terms of the amount required to produce an effect of
 141 given intensity.

142 Note to entry: The potency is expressed as mass fraction in milligrams per gram (mg/g), or as activity
 143 content in International Units (IU) per gram, or as a volume fraction or mass fraction in percent, or as an
 144 amount-of-substance concentration (molar fraction) in mole per litre of ingredients in the test substance.

145 **3.2.2**

146 **concentration**

147 amount of an antimicrobial agent in a defined volume of liquid

148 Note 1 to entry: The concentration is expressed as mg/l.

149 Note 2 to entry: mg/l is the designated ISO unit.

150 **3.3**

151 **stock solution**

152 initial solution used for further dilutions

153 **3.4**

154 **minimum inhibitory concentration**

155 **MIC**

156 lowest concentration that, under defined *in vitro* conditions, prevents visible growth of bacteria within a
 157 defined period of time

158 Note to entry: The MIC is expressed in mg/l.

159 **3.5**

160 **breakpoint**

161 **BP**

162 specific values of parameters, such as MICs, on the basis of which bacteria can be assigned to the clinical
 163 categories “susceptible”, “intermediate” and “resistant”

164 Note to entry: For current interpretive breakpoints, reference can be made to the latest publications of
 165 organisations employing this reference method (e.g. CLSI and EUCAST).

166 **3.6**

167 **wild type**

168 absence of known resistance mechanisms to the antimicrobial agent for a given strain

169 **3.7**

170 **reference strain**

171 catalogued, characterized bacteria with stable, defined antimicrobial susceptibility phenotypes and/or
 172 genotypes

173 Note to entry: Reference strains are kept as stock cultures, from which working cultures are derived.
 174 They are obtainable from culture collections and used for quality control.