



**NSAI**  
Standards

Irish Standard  
I.S. EN 17053:2018

# Animal feeding stuffs: Methods of sampling and analysis - Determination of trace elements, heavy metals and other elements in feed by ICP-MS (multi-method)

**I.S. EN 17053:2018**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN 17053:2018 is the adopted Irish version of the European Document EN 17053:2018, Animal feeding stuffs: Methods of sampling and analysis - Determination of trace elements, heavy metals and other elements in feed by ICP-MS (multi-method)

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EUROPEAN STANDARD

**EN 17053**

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English Version

**Animal feeding stuffs: Methods of sampling and analysis -  
Determination of trace elements, heavy metals and other  
elements in feed by ICP-MS (multi-method)**

Aliments des animaux - Méthodes d'échantillonnage et  
d'analyse - Dosage par ICP-MS (multiméthode) des  
éléments traces, métaux lourds et autres éléments  
inorganiques présents dans les aliments

Futtermittel - Probenahme- und  
Untersuchungsverfahren - Bestimmung von  
Spurenelementen, Schwermetallen und anderen  
Elementen in Futtermitteln mittels ICP-MS  
(Multimethode)

This European Standard was approved by CEN on 27 November 2017.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## Contents

Page

<b>1</b>	<b>Scope .....</b>	<b>4</b>
<b>2</b>	<b>Normative references .....</b>	<b>4</b>
<b>3</b>	<b>Principle .....</b>	<b>4</b>
<b>4</b>	<b>Reagents .....</b>	<b>5</b>
<b>5</b>	<b>Apparatus.....</b>	<b>6</b>
<b>6</b>	<b>Sampling.....</b>	<b>6</b>
<b>7</b>	<b>Preparation and preservation of test samples.....</b>	<b>6</b>
<b>7.1</b>	<b>General.....</b>	<b>6</b>
<b>7.2</b>	<b>Animal feeding stuff, which can be ground as such .....</b>	<b>7</b>
<b>7.3</b>	<b>Mineral animal feeding stuffs .....</b>	<b>7</b>
<b>8</b>	<b>Procedure.....</b>	<b>7</b>
<b>8.1</b>	<b>Pressure digestion .....</b>	<b>7</b>
<b>8.2</b>	<b>Extractable lead in minerals and feeds containing phyllosilicates (e.g. kaolinite clay) – extraction with diluted nitric acid .....</b>	<b>7</b>
<b>8.3</b>	<b>Calibration .....</b>	<b>8</b>
<b>8.4</b>	<b>Preparation of measurement solutions .....</b>	<b>8</b>
<b>8.5</b>	<b>Determination .....</b>	<b>9</b>
<b>8.6</b>	<b>Quality assurance.....</b>	<b>12</b>
<b>9</b>	<b>Calculation .....</b>	<b>12</b>
<b>10</b>	<b>Precision.....</b>	<b>13</b>
<b>10.1</b>	<b>General.....</b>	<b>13</b>
<b>10.2</b>	<b>Repeatability.....</b>	<b>13</b>
<b>10.3</b>	<b>Reproducibility.....</b>	<b>13</b>
<b>11</b>	<b>Test report.....</b>	<b>13</b>
	<b>Annex A (informative) Statistical results of interlaboratory tests (listed by element).....</b>	<b>14</b>
	<b>Annex B (informative) Interferences.....</b>	<b>27</b>
<b>B.1</b>	<b>Interferences in ICP-MS .....</b>	<b>27</b>
<b>B.2</b>	<b>Technical solutions to overcome interferences.....</b>	<b>28</b>
	<b>Bibliography.....</b>	<b>29</b>

## European foreword

This document (EN 17053:2018) has been prepared by Technical Committee CEN/TC 327 “Animal feeding stuffs - Methods of sampling and analysis”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2018, and conflicting national standards shall be withdrawn at the latest by July 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

**WARNING — The method described in this standard implies the use of reagents that pose a hazard to health. The standard does not claim to address all associated safety problems. It is the responsibility of the user of this standard to take appropriate measures for the health and safety protection of the personnel prior to use of the standard and to ensure that regulatory and legal requirements are complied with.**

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**EN 17053:2018 (E)****1 Scope**

This European Standard specifies a method for the determination of trace elements, heavy metals and other elements in animal feed by inductively coupled plasma mass spectrometry (ICP-MS). The method is used to determine As, Cd, Co, Cu, Fe, Hg, Mn, Mo, Pb, Se, Tl, U and Zn in the extraction solution after pressurized digestion. For the determination of extractable lead in minerals and feeds containing phyllosilicates (e.g. kaolinite clay) wet digestion with nitric acid should be used. The method described is suitable for use in quadrupole instruments equipped either with or without additional technology to reduce molecular ion interferences (e.g. collision or reaction technologies) as well as in high-resolution sector-field systems.

The method was fully statistically tested and evaluated in a collaborative trial comprising eight animal feeding stuff samples for the elements As, Cd, Co, Cu, Fe, Hg, Mn, Mo, Pb, Se, Tl, U and Zn. For elements with a HORRAT value higher than 2 (e.g. mercury, see Annex A) the method is more applicable as a screening method and not for confirmatory purposes. High-resolution sector-field ICP-MS was not tested in the validation ring trial.

The limit of quantification for each element is dependent on the sample matrix as well as the instrument. For the elements Co, Mn, Mo, Pb, Tl, U a limit of quantification of 0,10 mg/kg should normally be obtained, for the elements Fe and Zn 5,0 mg/kg, while for Cd 0,03 mg/kg, Hg 0,04 mg/kg and As 0,05 mg/kg should normally be quantifiable.

Details on the successfully tested working range for each element are described in this standard.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 6498, *Animal feeding stuffs — Guidelines for sample preparation (ISO 6498)*

**3 Principle**

For the determination of As, Cd, Co, Cu, Fe, Hg, Mn, Mo, Pb, Se, Tl, U and Zn a test portion of the sample is digested with concentrated nitric acid under pressure.

For the determination of extractable lead in minerals and feeds containing phyllosilicates (e.g. kaolinite clay) wet digestion with nitric acid should be used.

The concentration of the elements is determined by inductively coupled plasma mass spectrometry (ICP-MS) using external calibration or standard addition technique. To reduce occurring mass interferences mathematical correction equations, physical or chemical technical solutions (see B.2) or high-resolution sector-field ICP-MS may be applied.



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