



BSI Standards Publication

Determination of certain substances in electrotechnical products

Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV-AFS, ICP-OES and ICP-MS (IEC 62321-4:2013)

National foreword

This British Standard is the UK implementation of EN 62321-4:2014, including amendment A1:2017. It is identical to IEC 62321-4:2013, including amendment 1:2017. It supersedes BS EN 62321-4:2014, which is withdrawn.

The text of IEC amendment 1:2017 has been provided in its entirety at the beginning of this document. BSI's policy of providing consolidated content remains unchanged; however, in the interest of expediency, in this instance BSI have chosen to collate the relevant content at the beginning of this document.

The UK participation in its preparation was entrusted to Technical Committee GEL/111, Electrotechnical environment committee.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

Date	Text affected
31 March 2018	Implementation of IEC amendment 1:2017 with CENELEC endorsement A1:2017

**Determination of certain substances in electrotechnical products -
Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV-AFS,
ICP-OES and ICP-MS
(IEC 62321-4:2013)**

Détermination de certaines substances
dans les produits électrotechniques -
Partie 4: Mercure dans les polymères,
métaux et produits électroniques par CV-
AAS, CV-AFS, ICP-OES et ICP-MS
(CEI 62321-4:2013)

Verfahren zur Bestimmung von
bestimmten Substanzen in Produkten der
Elektrotechnik -
Teil 4: Quecksilber in Polymeren, Metallen
und Elektronik mit CV-AAS, CV-AFS, ICP-
OES und ICP-MS
(IEC 62321-4:2013)

This European Standard was approved by CENELEC on 2013-11-15. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 111/299/FDIS, future edition 1 of IEC 62321-4, prepared by IEC/TC 111 "Environmental standardization for electrical and electronic products and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62321-4:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-10-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-11-15

EN 62321-4:2014 is a partial replacement of EN 62321:2009, forming a structural revision and replacing Clause 7 and Annex E.

Future parts in the EN 62321 series will gradually replace the corresponding clauses in EN 62321:2009. Until such time as all parts are published, however, EN 62321:2009 remains valid for those clauses not yet re-published as a separate part.

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

Endorsement notice

The text of the International Standard IEC 62321-4:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 62321-5	NOTE	Harmonised as EN 62321-5.
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English Version

Determination of certain substances in electrotechnical products
- Part 4: Mercury in polymers, metals and electronics
by CV-AAS, CV-AFS, ICP-OES and ICP-MS
(IEC 62321-4:2013/A1:2017)

Détermination de certaines substances dans les produits
électrotechniques - Partie 4: Mercure dans les polymères,
métaux et produits électroniques par CV-AAS, CV-AFS,
ICP-OES et ICP-MS
(IEC 62321-4:2013/A1:2017)

Verfahren zur Bestimmung von bestimmten Substanzen in
Produkten der Elektrotechnik - Teil 4: Quecksilber in
Polymeren, Metallen und Elektronik mit CV-AAS, CV-AFS,
ICP-OES und ICP-MS
(IEC 62321-4:2013/A1:2017)

This amendment A1 modifies the European Standard EN 62321-4:2014; it was approved by CENELEC on 2017-08-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 111/414/CDV, future IEC 62321-4:2013/A1, prepared by IEC/TC 111 "Environmental standardization for electrical and electronic products and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62321-4:2014/A1:2017.

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publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-08-17
standards conflicting with the
document have to be withdrawn

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Endorsement notice

The text of the International Standard IEC 62321-4:2013/A1:2017 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62321-1	-	Determination of certain substances in electrotechnical products - Part 1: Introduction and overview	EN 62321-1	-
IEC 62321-2	-	Determination of certain substances in electrotechnical products - Part 2: Disassembly, disjunction and mechanical sample preparation	EN 62321-2	-
IEC 62321-3-1	-	Determination of certain substances in electrotechnical products - Part 3-1: Screening electrotechnical products for lead, mercury, cadmium, total chromium and total bromine using X-ray Fluorescence Spectrometry	EN 62321-3-1	-
IEC 62554	-	Sample preparation for measurement of mercury level in fluorescent lamps	EN 62554	-
ISO 3696	-	Water for analytical laboratory use - Specification and test methods	EN ISO 3696	-

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1 AMENDEMENT 1

**Determination of certain substances in electrotechnical products –
Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV-AFS,
ICP-OES and ICP-MS**

**Détermination de certaines substances dans les produits électrotechniques –
Partie 4: Mercure dans les polymères, métaux et produits électroniques par
CV-AAS, CV-AFS, ICP-OES et ICP-MS**

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FOREWORD

This amendment has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.

The text of this amendment is based on the following documents:

CDV	Report on voting
111/414/CDV	111/431/RVC

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

1 Scope

Delete, in the second sentence of the second paragraph, the words "cold cathode".

5.1 General

Add, at the end of the subclause, the following new text:

Warning: Analytical experts need to investigate the matrix effect or possible interferences of the phosphor to choose the appropriate conditions.

6 Sampling and test portion

Replace the existing third paragraph with the following new text:

For the sample preparation of mercury in fluorescent lamps, follow the instructions given in IEC 62554.

8.1 General

Add, before the NOTE, the following new text:

"CV-AAS" is the preferred method due to its sensitivity and ease of use for fluorescent lamps.

9 Calculation

Replace the existing text and formula with the following new text and formulae:

The concentration measured in 8.3 is the concentration of mercury in the sample solution. The total amount of mercury in the sample is calculated from Formula (1):

$$m_{\text{Hg}} = (A_1 - A_2) \times V_{1\text{Hg}} \times D \quad (1)$$

where

m_{Hg} is the total (absolute) amount of mercury in the sample in mg;

$V_{1\text{Hg}}$ is the total volume of the original sample solution in l;

D is the diluting factor after diluting the original sample solution;

A_1 is the concentration of Hg in the sample solution in mg/l;

A_2 is the concentration of Hg in the reagent blank solution in mg/l;

The total concentration of mercury in the sample is calculated from Formula (2):

$$C_{\text{Hg}} = \frac{(A_3 - A_4)}{M} \times V_{2\text{Hg}} \times D \quad (2)$$

where

C_{Hg} is the total concentration of Hg in the sample in µg/g;

$V_{2\text{Hg}}$ is the total volume of the original sample solution in ml;

D is the diluting factor after diluting the original sample solution;

A_3 is the concentration of Hg in the sample solution in mg/l;

A_4 is the concentration of Hg in the reagent blank solution in mg/l;

M is the mass of the original/complete sample in g.

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