This is a free page sample. Access the full version online.

NSAI Standards

Irish Standard
I.S. EN IEC 62321-2:2021

Determination of certain substances in electrotechnical products - Part 2: Disassembly, disjointment and mechanical sample preparation

© CENELEC 2021 No copying without NSAI permission except as permitted by copyright law.

This is a free page sample. Access the full version online.

I.S. EN IEC 62321-2:2021

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN IEC 62321-2:2021	2021-10-08

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2021-10-27	13.020.01 43.040.10 NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

This is a free page sample. Access the full version online.

National Foreword

I.S. EN IEC 62321-2:2021 is the adopted Irish version of the European Document EN IEC 62321-2:2021, Determination of certain substances in electrotechnical products - Part 2: Disassembly, disjointment and mechanical sample preparation

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This is a free page sample. Access the full version online.

This page is intentionally left blank

This is a free page sample. Access the full version online.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62321-2

October 2021

ICS 13.020.01; 43.040.10

Supersedes EN 62321-2:2014 and all of its amendments and corrigenda (if any)

English Version

Determination of certain substances in electrotechnical products - Part 2: Disassembly, disjointment and mechanical sample preparation (IEC 62321-2:2021)

Détermination de certaines substances dans les produits électrotechniques - Partie 2: Démontage, défabrication et préparation mécanique de l'échantillon (IEC 62321-2:2021)

Verfahren zur Bestimmung von bestimmten Substanzen in Produkten der Elektrotechnik - Teil 2: Demontage, Zerlegung und mechanische Probenvorbereitung (IEC 62321-2:2021)

This European Standard was approved by CENELEC on 2021-10-04. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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: Rue de la Science 23, B-1040 Brussels

© 2021 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN IEC 62321-2:2021 E

This is a free page sample. Access the full version online.

European foreword

The text of document 111/619/FDIS, future edition 2 of IEC 62321-2, 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 IEC 62321-2:2021.

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) 2022–07–04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024–10–04

This document supersedes EN 62321-2:2014 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62321-2:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 62554:2011 NOTE Harmonized as EN 62554:2011 (not modified)

IEC 63000:2016 NOTE Harmonized as EN IEC 63000:2018 (not modified)

IEC 62137-1-2:2007 NOTE Harmonized as EN 62137-1-2:2007 (not modified)

IEC 62239-1:2018 NOTE Harmonized as EN IEC 62239-1:2018 (not modified)

This is a free page sample. Access the full version online.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 62321	(series)	Determination of certain substances in electrotechnical products	EN 62321	(series)

This is a free page sample. Access the full version online.

This page is intentionally left blank

This is a free page sample. Access the full version online.

IEC 62321-2

Edition 2.0 2021-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

HORIZONTAL PUBLICATION
PUBLICATION HORIZONTALE

Determination of certain substances in electrotechnical products – Part 2: Disassembly, disjointment and mechanical sample preparation

Détermination de certaines substances dans les produits électrotechniques – Partie 2: Démontage, défabrication et préparation mécanique de l'échantillon

IEC 62321-2:2021-08(en-fr)

This is a free page sample. Access the full version online.

THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC online collection - oc.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

This is a free page sample. Access the full version online.

IEC 62321-2

Edition 2.0 2021-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

HORIZONTAL PUBLICATION
PUBLICATION HORIZONTALE

Determination of certain substances in electrotechnical products – Part 2: Disassembly, disjointment and mechanical sample preparation

Détermination de certaines substances dans les produits électrotechniques – Partie 2: Démontage, défabrication et préparation mécanique de l'échantillon

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 13.020.01; 43.040.10

ISBN 978-2-8322-9926-5

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

This is a free page sample. Access the full version online.

CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms, definitions and abbreviated terms 9
3.1 Terms and definitions 9
3.2 Abbreviated terms 9
4 Introduction to sampling 10
4.1 Introductory remarks 10
4.2 Requirements for certain substances 10
4.3 Complexity of electrotechnical products and related challenges 11
4.4 Sampling procedure 12
4.5 Scope of the analysis 13
4.6 Purpose of the analysis 14
4.7 Testing strategy 14
5 Sampling plan 15
5.1 Introductory remarks 15
5.2 Sampling of a complete product 15
5.3 Partial disassembly 16
5.4 Complete disassembly 16
5.5 Partial disjointment 16
5.6 Complete disjointment 16
5.7 Test sample considerations 17
5.7.1 Introductory remarks 17
5.7.2 Required sample size 17
5.7.3 Sample size versus detection limit 18
5.7.4 Composite sample considerations 19
5.7.5 Non-uniform "homogeneous materials" 19
5.7.6 Determination of sampling of homogeneous materials from different positions 21
6 Conclusions and recommendations for sampling 21
7 Mechanical sample preparation 21
7.1 Overview 21
7.1.1 Field of application 21
7.1.2 Quality assurance 22
7.2 Apparatus, equipment and materials 22
7.3 Procedure 23
7.3.1 General 23
7.3.2 Manual cutting 23
7.3.3 Coarse grinding or milling 23
7.3.4 Homogenizing 23
7.3.5 Fine grinding or milling 23
7.3.6 Very fine grinding of polymers and organic materials 24
Annex A (informative) Examples of procedures for sampling and disjointment 25
Annex B (informative) Probability of the presence of certain substances 33
Annex C (informative) Composite testing and sampling 37

This is a free page sample. Access the full version online.

C.1 Introductory remarks ... 37
C.2 Calculated maximum concentration for a composite sample based on detection limit ... 37
C.3 Required detection limit for a composite sample based on the maximum allowable concentration ... 38
Annex D (informative) Tools used in sampling ... 40
Annex E (informative) Examples of mobile phone disassembly and disjointment ... 41
E.1 General ... 41
E.2 Partial disassembly without tools – Mobile phone type A ... 41
E.3 Partial disassembly with simple tools – Mobile phone type B ... 43
E.4 Complete disassembly – Mobile phone type B ... 44
E.5 Partial disjointment – Mobile phone type B ... 45
E.6 Complete disjointment – Examples of disjointment of small electronic parts ... 46
E.7 Complete disjointment of integrated circuit lead frame package ... 48
E.8 Complete disjointment of ball grid array (BGA) package ... 48
E.8.1 General ... 48
E.8.2 Solder ball removal from BGA package – Hand removal procedure ... 49
E.8.3 Solder ball removal from BGA package – Solder ball shear procedure ... 50
Bibliography ... 51

Figure 1 – Generic iterative procedure for sampling ... 12
Figure 2 – Cross-section of a 900 µm wide lead oxide-based resistor (SMD) ... 20
Figure A.1 – Methodology for sampling and disjointment ... 26
Figure A.2 – Sampling of DVD player ... 27
Figure A.3 – Sampling of LCD TV ... 28
Figure A.4 – Sampling of PDA ... 29
Figure A.5 – Sampling of desk fan ... 30
Figure A.6 – Sampling of parts – Thick film resistor ... 31
Figure A.7 – Sampling of parts – SMD potentiometer ... 32
Figure D.1 – Hot gas gun for removing electronic parts ... 40
Figure D.2 – Vacuum pin to remove target electronic devices ... 40
Figure E.1 – Mobile phone type A with battery charger and camera lens cap ... 41
Figure E.2 – Mobile phone type A with battery and back cover removed ... 42
Figure E.3 – Partial disassembly of a mobile phone (type B) into its major parts ... 43
Figure E.4 – Complete disassembly of key pad ... 44
Figure E.5 – Complete disassembly of bottom housing ... 44
Figure E.6 – Complete disassembly of other housing or frame ... 45
Figure E.7 – Parts of the TFT display of the mobile phone (type B) after partial disjointment ... 45
Figure E.8 – Parts of the main PCB of the mobile phone (type B) after partial disjointment ... 46
Figure E.9 – Disjointment of lead frame ... 48
Figure E.10 – BGA package prior to disjointment ... 49
Figure E.11 – BGA package disjointed by hand removal procedure ... 49
Figure E.12 – Solder ball material collected from BGA using hand removal procedure ... 50
Figure E.13 – BGA solder ball removal using ball shear procedure ... 50

This is a free page sample. Access the full version online.

Table 1 – Minimum number of lead frame samples required for analytical testing 17
Table 2 – Levels of a certain substance (e.g. Pb) in a composite sample 19
Table B.1 – Probability of the presence of certain substances in materials and parts used in electrotechnical products 33
Table B.2 – Probability of the presence of additional certain substances in polymeric materials 36
Table C.1 – Calculated maximum concentration for a composite sample based on detection limit 38
Table C.2 – Required detection limit for a composite sample based on the maximum allowable concentration 39
Table E.1 – Possible certain substances or screening substances from a mobile phone (type A) 42
Table E.2 – Possible certain substances in major parts of the mobile phone (type B) 43
Table E.3 – Examples of disjointment for typical small electronic parts 47

This is a free page sample. Access the full version online.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DETERMINATION OF CERTAIN SUBSTANCES IN ELECTROTECHNICAL PRODUCTS –

Part 2: Disassembly, disjointment and mechanical sample preparation

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62321-2 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems. It is an International Standard.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Reference to the IEC 62321 series instead of to a list of individual parts of the IEC 62321 series.
b) Update of the flow chart in Figure 1. Restructure of Clause 4 and update of examples in Annex A.

This is a free page sample. Access the full version online.

c) Adjustment of the risk levels of certain parts and materials to reflect the recent technology development and material change. Update of Table B.1 to include the risk levels of phthalates. Creation of Table B.2 for other substances (e.g. HBCDD, PAH) in polymeric materials.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
111/619/FDIS	111/628/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62321 series, published under the general title *Determination of certain substances in electrotechnical products,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

This is a free page sample. Access the full version online.

INTRODUCTION

The widespread use of electrotechnical products has drawn increased attention to their impact on the environment. In many countries this has resulted in the adaptation of regulations affecting wastes, substances and energy use of electrotechnical products.

The use of certain substances in electrotechnical products is a source of either concern or importance in current and proposed regional legislations.

The purpose of the IEC 62321 series is therefore to provide test methods that will allow the electrotechnical industry to determine the levels of certain substances in electrotechnical products on a consistent global basis. This document, as an important part of the IEC 62321 series, covers strategies of sampling along with the mechanical preparation.

WARNING – Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

This is a free page sample. Access the full version online.

DETERMINATION OF CERTAIN SUBSTANCES IN ELECTROTECHNICAL PRODUCTS –

Part 2: Disassembly, disjointment and mechanical sample preparation

1 Scope

This part of IEC 62321 provides strategies of sampling along with the mechanical preparation of samples from electrotechnical products. These samples can be used for analytical testing to determine the levels of certain substances as described in the test methods in other parts of the IEC 62321 series. Restrictions for substances will vary between geographic regions and can be updated on a regular basis. This document describes a generic process for obtaining and preparing samples prior to the determination of any substance of concern.

This document does not provide:

– full guidance on each and every product that could be classified as electrotechnical product. Since there is a huge variety of electrotechnical parts, with various structures and compositions, along with the continuous innovations in the industry, it is unrealistic to attempt to provide procedures for the disjointment of every type of part;
– guidance regarding other routes to gather additional information on certain substances in a product, although the information collected has relevance to the sampling strategies in this document;
– safe disassembly and mechanical disjointment instructions related to electrotechnical products (e.g. mercury-containing switches) and the recycling industry (e.g. how to handle CRTs or the safe removal of batteries). See IEC 62554 [1] [1] for the disjointment and mechanical sample preparation of mercury-containing fluorescent lamps;
– sampling procedures for packaging and packaging materials;
– analytical procedures to measure the levels of certain substances. This is covered by other standards (e.g. other parts of the IEC 62321 series), which are referred to as "test standards" in this document;
– guidelines for assessment of compliance.

This document has the status of a horizontal standard in accordance with IEC Guide 108 [2].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62321 (all parts), *Determination of certain substances in electrotechnical products*

[1] Numbers in square brackets refer to the bibliography.

SAI GLOBAL

This is a free preview. Purchase the entire publication at the link below:

Product Page

Looking for additional Standards? Visit Intertek Inform Infostore

Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation