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Standards

Irish Standard  
I.S. EN IEC 62435-7:2021

# Electronic components - Long-term storage of electronic semiconductor devices - Part 7: Micro-electromechanical devices

**I.S. EN IEC 62435-7:2021**

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

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NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

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## National Foreword

I.S. EN IEC 62435-7:2021 is the adopted Irish version of the European Document EN IEC 62435-7:2021, Electronic components - Long-term storage of electronic semiconductor devices - Part 7: Micro-electromechanical devices

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EUROPEAN STANDARD

**EN IEC 62435-7**

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2021

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ICS 31.020

English Version

**Electronic components - Long-term storage of electronic  
semiconductor devices - Part 7: Micro-electromechanical  
devices  
(IEC 62435-7:2020)**

Composants électroniques - Stockage de longue durée des  
dispositifs électroniques à semiconducteurs - Partie 7:  
Dispositifs microélectromécaniques  
(IEC 62435-7:2020)

Elektronische Bauteile - Langzeitlagerung elektronischer  
Halbleiterbauelemente - Teil 7: Bauelemente der  
Mikrosystemtechnik  
(IEC 62435-7:2020)

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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.

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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**

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## **EN IEC 62435-7:2021 (E)**

### **European foreword**

The text of document 47/2664/FDIS, future edition 1 of IEC 62435-7, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62435-7:2021.

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) 2021-10-08
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-01-08

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

IEC/TR 62258-3 NOTE Harmonized as CLC/TR 62258-3

## 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60721-3-1	-	Classification of environmental conditions - Part 3-1: Classification of groups of environmental parameters and their severities - Storage	EN IEC 60721-3-1	-
IEC 60749-20	-	Semiconductor devices - Mechanical and climatic test methods - Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat	EN IEC 60749-20	-
IEC 60749-20-1	-	Semiconductor devices - Mechanical and climatic test methods - Part 20-1: Handling, packing, labelling and shipping of surface-mount devices sensitive to the combined effect of moisture and soldering heat	-	-
IEC 62435-2	-	Electronic components - Long-term storage of electronic semiconductor devices - Part 2: Deterioration mechanisms	EN 62435-2	-
IEC 62435-3	-	Electronic components - Long-term storage of electronic semiconductor devices - Part 3: Data	EN IEC 62435-3	-
IEC 62435-4	-	Electronic components - Long-term storage of electronic semiconductor devices - Part 4: Storage	EN IEC 62435-4	-
IEC 62435-5	-	Electronic components - Long-term storage of electronic semiconductor devices - Part 5: Die and wafer devices	EN 62435-5	-

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**IEC 62435-7**

Edition 1.0 2020-12

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

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**Electronic components – Long-term storage of electronic semiconductor devices –  
Part 7: Micro-electromechanical devices**

**Composants électroniques – Stockage de longue durée des dispositifs  
électroniques à semiconducteurs –  
Partie 7: Dispositifs microélectromécaniques**





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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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**IEC 62435-7**

Edition 1.0 2020-12

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

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**Electronic components – Long-term storage of electronic semiconductor devices –  
Part 7: Micro-electromechanical devices**

**Composants électroniques – Stockage de longue durée des dispositifs électroniques à semiconducteurs –  
Partie 7: Dispositifs microélectromécaniques**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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INTERNATIONALE

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**ELECTRONIC COMPONENTS – LONG-TERM STORAGE  
OF ELECTRONIC SEMICONDUCTOR DEVICES –**
**Part 7: Micro-electromechanical devices****FOREWORD**

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

Draft	Report on voting
47/2664/FDIS	47/2669/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts in the IEC 62435 series, published under the general title *Electronic components – Long-term storage of electronic semiconductor devices*, 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 "<http://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.

## INTRODUCTION

This document applies to the long-term storage of electronic components.

This is a standard for long-term storage (LTS) of electronic devices drawing on the best long-term storage practices currently known. For the purposes of this document, LTS is defined as any device storage whose duration may be more than 12 months for product scheduled for long duration storage. While intended to address the storage of unpackaged semiconductors and packaged electronic devices, nothing in this document precludes the storage of other items under the storage levels defined herein.

Although it has always existed to some extent, obsolescence of electronic components and particularly of integrated circuits, has become increasingly intense over the last few years.

Indeed, with the existing technological boom, the commercial life of a component has become very short compared with the life of industrial equipment such as that encountered in the aeronautical field, the railway industry or the energy sector.

The many solutions enabling obsolescence to be resolved are now identified. However, selecting one of these solutions should be preceded by a case-by-case technical and economic feasibility study, depending on whether storage is envisaged for field service or production, for example:

- remedial storage as soon as components are no longer marketed;
- preventive storage anticipating declaration of obsolescence.

Taking into account the expected life of some installations, sometimes covering several decades, the qualification times, and the unavailability costs, which can also be very high, the solution to be adopted to resolve obsolescence should often be rapidly implemented. This is why the solution retained in most cases consists in systematically storing components which are in the process of becoming obsolescent.

The technical risks of this solution are, a priori, fairly low. However, it requires perfect mastery of the implemented process and especially of the storage environment, although this mastery becomes critical when it comes to long-term storage.

All handling, protection, storage and test operations are recommended to be performed according to the state of the art.

The application of the approach proposed in this document in no way guarantees that the stored components are in perfect operating condition at the end of this storage. It only comprises a means of minimizing potential and probable degradation factors.

Some electronic device users have the need to store electronic devices for long periods of time. Lifetime buys are commonly made to support production runs of assemblies that well exceed the production timeframe of their individual parts. This puts the user in a situation requiring careful and adequate storage of such parts to maintain the as-received solderability and minimize any degradation effects to the part over time. Major degradation concerns are moisture, electrostatic fields, ultraviolet light, large variations in temperature, air-borne contaminants, and outgassing.

Warranties and sparing also present a challenge for the user or repair agency as some systems have been designated to be used for long periods of time, in some cases for up to 40 years or more. Some of the devices needed for repair of these systems will not be available from the original supplier for the lifetime of the system or the spare assembly may be built with the original production run but then require long-term storage. This document was developed to provide a standard for storing electronic devices for long periods of time. For storage of devices that are moisture sensitive but that do not need to be stored for long periods of time, refer to IEC TR 62258-3.

Long-term storage assumes that the device is going to be placed in uninterrupted storage for a number of years. It is essential that it is useable after storage. Particular attention should be paid to storage media surrounding the devices together with the local environment.

These guidelines do not imply any warranty of product or guarantee of operation beyond the storage time given by the manufacturer.

The IEC 62435 series is intended to ensure that adequate reliability is achieved for devices in user applications after long-term storage. Users are encouraged to request data from suppliers to applicable specifications to demonstrate a successful storage life as requested by the user. These standards are not intended to address built-in failure mechanisms that would take place regardless of storage conditions.

These standards are intended to give practical guide to methods of long-duration storage of electronic components where this is intentional or planned storage of product for a number of years. Storage regimes for work-in-progress production are managed according to company internal process requirements and are not detailed in this series of standards.

The overall standard series is split into a number of parts. Parts 1 to 4 apply to any long-term storage and contain general requirements and guidance, whereas Parts 5 to 9 are specific to the type of product being stored. It is intended that the product specific part should be read alongside the general requirements of Part 1 to 4.

Electronic components requiring different storage conditions are covered separately starting with Part 5.

The structure of the IEC 62435 series as currently conceived is as follows:

- Part 1 – General
- Part 2 – Deterioration mechanisms
- Part 3 – Data
- Part 4 – Storage
- Part 5 – Die and wafer devices
- Part 6 – Packaged or finished devices
- Part 7 – Micro-electromechanical devices – MEMS
- Part 8 – Passive electronic devices
- Part 9 – Special cases



# ELECTRONIC COMPONENTS – LONG-TERM STORAGE OF ELECTRONIC SEMICONDUCTOR DEVICES –

## Part 7: Micro-electromechanical devices

### 1 Scope

This part of IEC 62435 on long-term storage applies to micro-electromechanical devices (MEMS) in long-term storage that can be used as part of obsolescence mitigation strategy. Long-term storage refers to a duration that may be more than 12 months for products scheduled for storage. Philosophy, good working practice, and general means to facilitate the successful long-term storage of electronic components are also addressed.

### 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 60721-3-1, *Classification of environmental conditions – Part 3-1: Classification of groups of environmental parameters and their severities – Storage*

IEC 60749-20, *Semiconductor devices – Mechanical and climatic test methods – Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat*

IEC 60749-20-1, *Semiconductor devices – Mechanical and climatic test methods – Part 20-1: Handling, packing, labelling and shipping of surface-mount devices sensitive to the combined effect of moisture and soldering heat*

IEC 62435-2, *Electronic components – Long-term storage of electronic semiconductor devices – Part 2: Deterioration mechanisms*

IEC 62435-3, *Electronic components – Long-term storage of electronic semiconductor devices – Part 3: Data*

IEC 62435-4, *Electronic components – Long-term storage of electronic semiconductor devices – Part 4: Storage*

IEC 62435-5, *Electronic components – Long-term storage of electronic semiconductor devices – Part 5: Die and wafer devices*

### 3 Terms and definitions

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

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

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