

Locking devices for ball and socket couplings of string
insulator units - Dimensions and tests

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60372:2020 sisaldab Euroopa standardi EN IEC 60372:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60372:2020 consists of the English text of the European standard EN IEC 60372:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 09.10.2020.	Date of Availability of the European standard is 09.10.2020.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 17.220.99, 29.035.99

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Locking devices for ball and socket couplings of string insulator
units - Dimensions and tests
(IEC 60372:2020)

Dispositifs de verrouillage pour les assemblages à rotule et
logement de rotule des éléments de chaînes d'isolateurs -
Dimensions et essais
(IEC 60372:2020)

Sicherungsvorrichtungen für Klöppel- und
Pfannenverbindungen von Kettenisolatoren - Maße und
Prüfungen (IEC 60372:2020)

This European Standard was approved by CENELEC on 2020-08-26. 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

European foreword

The text of document 36/485/FDIS, future edition 4 of IEC 60372, prepared by IEC/TC 36 "Insulators" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60372:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2021-05-26 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2023-08-26 document have to be withdrawn

This document supersedes EN 60372:2004 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.

Endorsement notice

The text of the International Standard IEC 60372:2020 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 60120:2020	NOTE	Harmonized as EN IEC 60120:2020 (not modified)
IEC 61325:1995	NOTE	Harmonized as EN 61325:1995 (not modified)

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-471	-	International Electrotechnical Vocabulary - Part 471: Insulators	-	-
ISO 6506-1	-	Metallic materials - Brinell hardness test - Part 1: Test method	EN ISO 6506-1	-
ISO 6507-1	-	Metallic materials – Vickers Hardness – Test Part 1: Test Method	EN ISO 6507-1	-
ISO 6508-1	-	Metallic materials – Rockwell Hardness – Test Part 1: Test Method	EN ISO 6508-1	-

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Locking devices for ball and socket couplings of string insulator units –
Dimensions and tests**

**Dispositifs de verrouillage pour les assemblages à rotule et logement de rotule
des éléments de chaînes d'isolateurs – Dimensions et essais**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 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 Varembe
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.

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 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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.

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.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Locking devices for ball and socket couplings of string insulator units –
Dimensions and tests**

**Dispositifs de verrouillage pour les assemblages à rotule et logement de rotule
des éléments de chaînes d'isolateurs – Dimensions et essais**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.080.10; 29.240.20

ISBN 978-2-8322-8477-3

**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.**

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Shapes and dimensions.....	7
4.1 General.....	7
4.2 Shapes of the locking devices.....	7
4.2.1 Split-pin.....	7
4.2.2 W-clip.....	7
4.3 Dimensions of locking devices	7
4.3.1 The split-pins (standard and alternative type)	7
4.3.2 The W-clips	8
5 Test.....	9
5.1 Classification of tests.....	9
5.2 Qualification tests	10
5.2.1 Test items and the samples	10
5.2.2 Hardness test	10
5.2.3 Verification of resistance of bending	10
5.2.4 Corrosion resistance test.....	11
5.3 Sample tests and sampling	12
5.3.1 Sample tests.....	12
5.3.2 Sampling	12
5.3.3 Visual examination	13
5.3.4 Verification of dimensions.....	13
5.3.5 Hardness test	14
5.3.6 Verification of resistance to bending (for split-pins only)	14
5.4 Re-test procedure	14
Annex A (normative) Gauge for W-clips	15
Annex B (normative) Other dimensions of split-pins	17
Annex C (informative) Method of using the locking devices.....	18
C.1 Overview.....	18
C.2 Method of using the locking devices – Split-pin.....	18
C.3 Method of using the locking devices – W-clip	18
Bibliography.....	19
Figure 1 – Shape of split-pins	8
Figure 2 – Shape of W-clips.....	9
Figure 3 – Arrangement of verification of resistance of bending	11
Figure 4 – Verification of L	13
Figure A.1 – Gauge for W-clips	15
Figure A.2 – Symbol marks for dimensions of W-clips	16
Figure B.1 – Other dimensions of the split-pins.....	17
Figure C.1 – Positions of split-pin	18
Figure C.2 – Positions of W-clip.....	18

Table 1 – Dimensions of the split-pins	8
Table 2 – Dimensions of W-clips	9
Table 3 – Radii of verification of resistance of bending	11
Table 4 – Size of the sample and acceptance number Ac	12
Table 5 – Specifications of K and D_4 in Figure 4	13
Table A.1 – Dimensions of the gauge for W-clips	16
Table B.1 – Other dimensions of the split-pins	17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOCKING DEVICES FOR BALL AND SOCKET COUPLINGS
OF STRING INSULATOR UNITS – DIMENSIONS AND TESTS**

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.

International Standard IEC 60372 has been prepared by IEC technical committee 36: Insulators.

This fourth edition cancels and replaces the third edition published in 1984. This edition constitutes a technical revision.

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

- a) Two new designated size of couplings, 36 and 40, were introduced;
- b) According to the results of the questionnaire (36/424/Q), the relevant content of the 28B W-clip was deleted;
- c) Annex A is informative, Annex B is normative, Annex C is informative.

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

FDIS	Report on voting
36/485/FDIS	36/493/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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.

LOCKING DEVICES FOR BALL AND SOCKET COUPLINGS OF STRING INSULATOR UNITS – DIMENSIONS AND TESTS

1 Scope

This international standard is applicable to locking devices used with ball and socket couplings of string insulator units and used with the corresponding metal fittings standardized in IEC 60120, when they are supplied separately.

When these locking devices are supplied with an insulator or fitting, they are considered as an integral part of it. In this case, the relevant test is to be included with those of insulators, as specified in IEC 60383-1 and IEC 61325. On request, a certificate is to be delivered confirming that the tests on locking devices as specified in this document have been carried out. The locking devices are usually supplied with the insulator or corresponding metal fittings.

The object of this document is

- to define the shapes and some standard dimensions for locking devices,
- to define the test methods for locking devices,
- to state the acceptance conditions for supply,
- to give other dimensions for guidance of manufacturing only.

The object of this document does not include the specification of the nature of the material, and the material covered by the scope of this document does not have a surface coating for corrosion protection. However, the material which will give rise to significant contact corrosion(chemical reaction) between the locking device and the ball and socket coupling does not covered by this document.

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 60050-471, *International Electrotechnical Vocabulary (IEV) – Part 471: Insulators*

ISO 6506-1, *Metallic materials – Brinell Hardness – Test Part 1: Test Method*

ISO 6507-1, *Metallic materials – Vickers Hardness – Test Part 1: Test Method*

ISO 6508-1, *Metallic materials – Rockwell Hardness – Test Part 1: Test Method*

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 60050-471 and the following apply.