
Locking devices for ball and socket couplings of string insulator units – Dimensions and tests (IEC 60372:1984+A1:1991+A2:2003)

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EUROPEAN STANDARD

EN 60372

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2004

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English version

**Locking devices for ball and socket couplings
of string insulator units –
Dimensions and tests
(IEC 60372:1984 + A1:1991 + A2:2003)**

Dispositifs de verrouillage pour
les assemblages à rotule et logement
de rotule des éléments de chaînes
d'isolateurs –
Dimensions et essais
(CEI 60372:1984 + A1:1991 + A2:2003)

Sicherungsvorrichtungen für Klöppel-
und Pfannen-Verbindungen
von Kettenisolatoren –
Maße und Prüfungen
(IEC 60372:1984 + A1:1991 + A2:2003)

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This European Standard was approved by CENELEC on 2004-06-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard, IEC 60372:1984 + A1:1991 + A2:2003, prepared by SC 36B, Insulators for overhead lines, of IEC TC 36, Insulators, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60372 on 2004-06-01 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60372:1984 + A1:1991 + A2:2003 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 Where 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 60120	1984	Dimensions of ball and socket couplings of string insulator units	HD 474 S1	1986
IEC 60383	1983 ¹⁾	Test on insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1 kV	-	-
ISO 2713	1973	Copper and copper alloys - Rockwell hardness test (B, F and G scales)	-	-
ISO 6506	1981	Metallic materials - Hardness test - Brinell test	-	-
ISO 6507-1	1982	Metallic materials - Hardness test - Vickers test Part 1: HV 5 to HV 100	-	-

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¹⁾ IEC 60383:1983 is superseded by IEC 60383-1:1993 and IEC 60383-2:1993 which are respectively harmonized as EN 60383-1:1996 and EN 60383-2:1995.

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

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Locking devices for ball and socket couplings of
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International Electrotechnical Commission
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembe Genève, Switzerland
IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

iTeh STANDARD PREVIEW

PREFACE

This standard has been prepared by Sub-Committee 36B: Insulators for Overhead Lines, of IEC Technical Committee No. 36: Insulators.

This third edition replaces IEC Publication 372-1 (second edition, 1977) and IEC Publication 372-2 (first edition, 1976).

The text of this standard is based upon the following documents:

Six Months' Rule	Report on Voting
36B(CO)79	36B(CO)82

Further information can be found in the Report on Voting indicated in the table above.

The following IEC publications are quoted in this standard:

- Publications Nos. 120 (1984): Dimensions of Ball and Socket Couplings of String Insulator Units.
383 (1983): Tests on Insulators of Ceramic Material or Glass for Overhead Lines with a Nominal Voltage Greater than 1000 V.

Other publications quoted:

- ISO Standard 2713 -1973: Copper and Copper Alloys - Rockwell Hardness Test (B, F and G scales).
ISO Standard 6506 -1981: Metallic Materials - Hardness Test - Brinell Test.
ISO Standard 6507/1-1982: Metallic Materials - Hardness Test - Vickers Test - Part 1: HV 5 to HV 100.

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

SECTION ONE – GENERAL

1. **Scope**

This 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 Publication 120: Dimensions of Ball and Socket Couplings of String Insulator Units, when they are supplied separately.

When these locking devices are supplied with an insulator or fitting, they shall be considered as an integral part of it. In this case, the relevant tests shall be included with those of insulators, as specified in IEC Publication 383: Tests on Insulators of Ceramic Material or Glass for Overhead Lines with a Nominal Voltage Greater than 1000 V. On request, a certificate shall be delivered confirming that the tests on locking devices as specified in this publication, have been carried out. The locking devices are usually supplied with the insulators or corresponding metal fittings.

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2. **Object**

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The object of this standard 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 standard does not include the specification of the nature of the material, but it is recommended that this material does not have a surface coating for corrosion protection. Moreover, the material shall not give rise to significant contact corrosion (chemical reaction) between the locking device and the ball and socket coupling.

3. **Plan of the standard**

The main part of this standard consists of the two following sections:

3.1 *Section Two: Dimensions and general rules*

Two types of locking devices are standardized, one using a split-pin, the other a W-shaped clip.

The first type requires a circular hole and the second a rectangular hole.

Two split-pins are proposed:

- *standard split-pin*: this split-pin is a tight-fit in the socket-hole;
- *alternative split-pin*: this split-pin is a loose fit in the socket-hole.

Note. – This alternative may be used by agreement between the manufacturer and the purchaser when the problems of stress corrosion are possible for the split-pin metal due to the permanent stress in the tight-fit system, e.g. when certain types of stainless steel are used.

The socket-hole into which the locking device fits is the same for both the standard and alternative split-pins, so it is possible to use the alternative split-pin in a socket designed for the standard split-pin.

See Clauses 5 and 6 for dimensions concerning split-pins.

See Clause 7 for dimensions concerning W-clips.

3.2 Section Three: Tests

The tests for locking devices are:

- visual examination;
- checking of dimensions;
- verification of resistance to bending;
- hardness test;
- corrosion resistance test (in some cases).

Note. – The operation test is carried out only if the locking devices are supplied on insulators or fittings, which is usually the case (see IEC Publication 383).

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SECTION TWO – DIMENSIONS AND GENERAL RULES
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4. Shape of the locking device

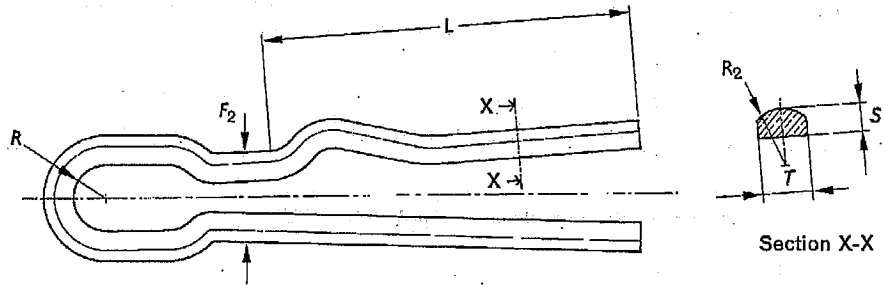
4.1 Split-pin

One of the legs of the split-pin has a hump and the free ends are bent outwards after insertion into the socket. These features provide two distinct positions for the split-pin when operated for locking and coupling, and complete withdrawal from the socket is effectively prevented (see Clause 8).

4.2 W-clip

The W-clip is so shaped that it will remain in two distinct positions when operated for coupling and locking. The shape of the W-clip is such that complete withdrawal from the socket when moving from the locking to the coupling position is prevented (see Clause 8).

- 5. Dimensions normalisées des goupilles (type normalisé et variante)
- 5. Standard dimensions of the split-pins (standard and alternative type)



134/84

Toutes les dimensions sont données en millimètres.

All dimensions are given in millimetres.

Assemblages normalisés Standard couplings	Goupilles normalisées Standard split-pins						Variantes de goupilles ¹⁾ Alternative split-pins ¹⁾
	S	T	R_2	$F_2 \text{ min}$	R_{min}	L_{min}	$F'_{2 \text{ max}}$
11	$2,2 \pm 0,1$	$4,8^{+0,2}_0$	3,3	8,2	2,5	29	7,3
16A	$3,2 \pm 0,1$	$5,5^{+0,2}_0$	3,8	10,3	3	38	9,2
16B	$3,2 \pm 0,1$	$7,9^{+0,2}_0$	4,8	10,7	3	38	9,7
20	$3,2 \pm 0,1$	$7,0^{+0,2}_0$	4,8	10,7	3	49	9,7
24	$4,0 \pm 0,1$	$8,7^{+0,2}_0$	5,7	12,8	3,5	60	11,7
28	$4,5 \pm 0,1$	$10,0^{+0,3}_0$	6,2	13,8	3,5	71	12,7
32	$5,2 \pm 0,1$	$11,5^{+0,3}_0$	7,2	15,8	3,5	81	14,7

¹⁾ Toutes les dimensions sont identiques à celles des goupilles normalisées, sauf F_2 remplacée par F'_2 .
All the dimensions are the same as for standard split-pins, except the value F_2 replaced by F'_2 .

La dimension L_{max} est spécifiée par l'acheteur de la goupille (voir paragraphe 13.1.1).

The dimension L_{max} shall be specified by the purchaser of the split-pin (see Sub-clause 13.1.1.)