

Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 3: Transition joints between cables with impregnated paper insulation and cables with extruded insulation

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-HD 629.3 S1:2024 sisaldab Euroopa standardi HD 629.3 S1:2024 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.01.2024.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-HD 629.3 S1:2024 consists of the English text of the European standard HD 629.3 S1:2024.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 19.01.2024.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
--	---

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

ICS 29.035.10, 29.060.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

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

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation: Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

ICS 29.035.10; 29.060.20

Supersedes HD 629.2 S2:2006 (PART); HD 629.2 S2:2006/A1:2008 (PART)

English Version

Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 3: Transition joints between cables with impregnated paper insulation and cables with extruded insulation

Exigences relatives aux essais des accessoires des câbles d'énergie pour des tensions assignées de 3,6/6(7,2) kV à 20,8/36(42) kV - Partie 3: Jonctions mixtes entre les câbles isolés au papier imprégné et les câbles à isolation extrudée

Prüfanforderungen für Kabelgarnituren für Starkstromkabel mit einer Nennspannung von 3,6/6(7,2) kV bis 20,8/36(42) kV - Teil 3: Übergangsmuffen für Kabel mit massegetränkter Papierisolierung und für Kabel mit extrudierter Kunststoffisolierung

This Harmonization Document was approved by CENELEC on 2023-12-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level.

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

This Harmonization Document exists in three official versions (English, French, German).

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, Türkiye 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

# Contents

Page

European foreword .....	4
Introduction .....	5
1.1 General.....	6
1.2 Type of accessories .....	6
1.3 Rated voltage .....	6
5.1 Connectors .....	9
5.2 Materials.....	9
6.1 Identification .....	9
6.1.1 Cables .....	9
6.1.2 Connectors.....	9
6.1.3 Accessories .....	9
6.2 Cable conductor nominal cross section .....	10
6.2.1 Paper cable.....	10
6.2.2 Polymeric cable.....	10
6.2.3 Qualification .....	10
6.3 Assembly.....	11
6.4 Transition joints .....	11
6.5 Test arrangements and number of samples .....	11
7.1 General.....	12
7.2 Connectors .....	12
7.3 Cable constructions.....	13
7.4 Extension of compliance to paper to paper cable joints.....	14
7.5 Extension of compliance from EPR or HEPR to XLPE/paper transition joints.....	14
8.1 General.....	14
8.2 Dynamic short circuit performance.....	14
9.1 General.....	15
9.2 Test reports .....	15
9.3 Failures.....	15
9.3.1 General .....	15
9.3.2 Installation or procedure errors .....	15
9.3.3 Cable failure .....	16
Annex A (normative) Identification.....	22
A.1 Identification of test cable (paper insulated) (see 6.1.1 and 9.2) .....	22
A.2 Identification of test cable (extruded insulation) (see 6.1.1 and 9.2).....	23
Annex B (normative) Identification of connector (see 6.1.2 and 9.2) .....	24
Annex C (normative) Visual examination .....	25
C.1 Method.....	25
C.2 Examination sheet .....	26
C.3 Special requirements for transition joints submitted to test sequence B3R .....	26
Annex D (informative) Test for quality check of insulation of paper insulated cable .....	27
D.1 Oil bath test .....	27
Annex E (normative) Test sequences B3W (Withstand) and B3R (Robustness) .....	28
E.1 General .....	28

E.2 Purpose .....	28
E.3 General test conditions .....	28
E.3.1 Test set-up .....	28
E.3.2 Mounting of the transition joints .....	28
E.4 AC voltage test .....	29
E.5 Combined water and conductor cycling test.....	29
E.5.1 General.....	29
E.5.2 Principle.....	29
E.5.3 Water heating cycles .....	29
E.5.4 Conductor heating cycles.....	29
E.5.5 Recordings .....	30
E.6 Electrical heat cycling test in air .....	30
E.7 AC breakdown test on set 1 and set 2 samples (for B3R category only).....	30
E.8 AC voltage test (for B3W category only) .....	31
E.9 Visual examination .....	31
Annex F (informative) Commonly used types of paper insulated cable designs.....	32
Bibliography .....	33
<b>Tables</b>	
Table 1 — Selection of nominal cross sections of extruded insulated cable vs paper insulated cable conductor nominal cross sections .....	10
Table 2 — Compliance and qualification scheme for transition joints .....	11
Table 3 — Compliance requirements of connectors for joints.....	13
Table 4 — Extension of compliance from tested paper cable to other types of paper cable .....	13
Table 5 — Compliance from tested extruded cable insulation to other extruded cable insulation.....	14
Table 6 — Transition joints between cables with impregnated paper insulation and cables with extruded insulation (see Table 9) .....	17
Table 7 — Additional tests for compliance extension to other conductor connectors.....	19
Table 8 — Summary of test voltages (refer to Clause 7) .....	20
Table 9 — Test arrangements for transition joints .....	21
<b>Figures</b>	
Figure E.1 — general diagram of the testing set-up.....	28
Figure E.2 — heating cycles (principle).....	30

## European foreword

This document (HD 629.3 S1:2024) has been prepared by the CLC/TC 20 "Electric cables".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-12-11
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-12-11

This document partially supersedes HD 629.2 S2:2006 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.

## Introduction

This document defines requirements and tests which can be called up for transition joints, when used between extruded insulated power cables and impregnated paper insulated power cables covered by HD 620 and HD 621 or another relevant standard.

This document is a preview generated by EVS

## 1 Scope

### 1.1 General

This document specifies performance requirements for type tests for transition joints for use between extruded insulated power cables as specified in HD 620 and impregnated paper insulated power cables as specified in HD 621 or another relevant standard.

Once type test for an accessory is successfully completed, it is not necessary to repeat the test, unless changes are made in the materials, design or manufacturing process, which might affect the performance characteristics.

Possible extra thermo-mechanical forces due to high current loads from renewable sources of power generation are not covered by these tests (under consideration).

Accessories for special applications such as submarine cables, ships cables or hazardous situations (explosive environments, fire resistant cables or seismic conditions) are not included.

Test methods are included in EN IEC 61442:— and Annex E.

NOTE 1 This document does not invalidate existing approvals of products achieved on the basis of national standards and specifications and/or the demonstration of satisfactory service performance. However, products approved according to such national standards or specifications cannot directly claim approval to this document.

NOTE 2 It might be possible, subject to agreement between supplier and purchaser, and/or the relevant conformity assessment body, to demonstrate that conformity to the earlier standard can be used to claim conformity to this document, provided an assessment is made of any additional type testing that might need to be carried out. Any such additional testing that is part of a sequence of testing cannot be done separately.

### 1.2 Type of accessories

The accessories covered by this document are straight and branch transition joints of all designs, suitable for use underground or in air.

### 1.3 Rated voltage

The rated voltages  $U_0/U$  ( $U_m$ ) of the accessories covered by this document are 3,6/6(7,2) - 3,8/6,6(7,2) - 6/10(12) - 6,35/11(12) - 8,7/15(17,5) - 12/20(24) - 12,7/22(24) - 18/30(36) - 19/33(36) - 20,8/36(42) kV.

## 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.

EN IEC 61238-1-3, *Compression and mechanical connectors for power cables - Part 1-3: Test methods and requirements for compression and mechanical connectors for power cables for rated voltages above 1 kV ( $U_m = 1,2$  kV) up to 36 kV ( $U_m = 42$  kV) tested on non-insulated conductors  $U_m = 1,2$  kV up to 36 kV ( $U_m = 42$  kV) tested on non-insulated conductors*

EN IEC 61442:—<sup>1</sup>, *Test methods for accessories for power cables with rated voltages from 6 kV ( $U_m = 7,2$  kV) up to 36 kV ( $U_m = 42$  kV) (IEC 61442:2023)*

HD 620 S2, *Distribution cables with extruded insulation for rated voltages from 3,6/6 (7,2) kV up to and including 20,8/36 (42) kV*

---

<sup>1</sup> To be published. Stage at the time of publication: FprEN IEC 61442:2023.

HD 621 S1, *Medium voltage impregnated paper insulated distribution cables*

HD 629.1 S3, *Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 1: Accessories for cables with extruded insulation*

IEC 60050-461, *International Electrotechnical Vocabulary - Chapter 461: Electric cables*

### 3 Definitions

For the purposes of this document, the terms and definitions given in IEC 60050-461 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **connector**

device for connecting a conductor to an equipment terminal or for connecting two or more conductors to each other

[SOURCE: EN IEC 61238-1-3]

#### 3.2

##### **joint**

accessory suitable for use in air or underground which makes a connection between two or more insulated power cables to form a continuous circuit

#### 3.3

##### **type I joint**

joint suitable for use where an impact resistance withstand is not required

#### 3.4

##### **type II joint**

joint which has an impact resistance withstand in accordance with this document

#### 3.5

##### **R category joint**

joint which has an AC breakdown minimum performance after extended immersion period in water with combined water and conductor heating cycling tests

#### 3.6

##### **W category joint**

joint which has an AC withstand minimum performance after extended immersion period in water with combined water and conductor heating cycling tests

#### 3.7

##### **Z category joint**

joint not tested with the extended immersion period in water and combined water and conductor heating cycling tests

#### 3.8

##### **straight joint**

accessory making a connection between two cables to form a continuous circuit

Note 1 to entry: For types of joint see 3.3 and 3.4.

[SOURCE: IEC 461-11-01]