

Overhead electrical lines exceeding AC 1 kV - Part 2-4:
National Normative Aspects (NNA) for Germany (based
on EN 50341-1:2012)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 50341-2-4:2016 sisaldab Euroopa standardi EN 50341-2-4:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 50341-2-4:2016 consists of the English text of the European standard EN 50341-2-4:2016.
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Overhead electrical lines exceeding AC 1 kV - Part 2-4: National
Normative Aspects (NNA) for Germany (based on EN 50341-
1:2012)

This European Standard was approved by CENELEC on 2015-12-01. 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 CEN-CENELEC Management Centre or to any CENELEC member.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

The following 6 statements are required from CLC/TC 11 for all NNAs; statement 7 was added by the German National Committee (NC).

- 1 The German National Committee is identified by the following address:

Deutsche Elektrotechnische Kommission im DIN und VDE (DKE)
Stresemannallee 15 (VDE Haus)
D-60596 Frankfurt/Main
Germany
phone ++49 69 6308-(0) 224
Fax ++49 69 6312-925

Name of the relevant technical body: Komitee 421 (K 421) "Freileitungen" (Overhead power lines)

- 2 The German NC and its technical body K 421 "Overhead power lines" of Deutsche Elektrotechnische Kommission im DIN und VDE (DKE) prepared this Part 2-4 of EN 50341, listing the German National Normative Aspects (NNA) under its sole responsibility, and duly passed it through the CENELEC and CLC/TC 11 procedures.

NOTE The German NC also takes sole responsibility for the technically correct co-ordination of this EN 50431-2-4 with EN 50341-1. It has performed the necessary checks in the frame of quality assurance/control. However, it is noted that this quality control has been made in the framework of the general responsibility of a standards committee under the national laws/regulations.

- 3 This EN 50341-2-4 is normative in Germany and informative in other countries.

- 4 This Part 2-4 has to be read in conjunction with EN 50341-1, hereafter referred to as Part 1. All clause numbers used in this NNA correspond to those of Part 1. Specific subclauses, which are prefixed "DE", are to be read as amendments to the relevant text in Part 1. Any necessary clarification regarding the application of this combined NNA in conjunction with Part 1 shall be referred to the German NC who will, in co-operation with CLC/TC 11, clarify the requirements.

When no reference is made in this NNA to a specific subclause, then Part 1 applies.

- 5 In case of "boxed values" defined in Part 1, amended values, (if any) which are defined in Part 2-4 shall be taken into account in Germany.

However, any "boxed value", whether in Part 1 or Part 2-4, shall not be amended in the direction of greater risk in a Project Specification.

- 6 The National German standards/regulations related to overhead electrical lines exceeding 1 kV AC are listed in 2.1 of this Part 2-4.

NOTE All national standards referred to in this Part 2-4 will be replaced by the relevant European Standards as soon as they become available and are declared by the German NC to be applicable and thus reported to the secretary of CLC/TC 11.

- 7 5.11.1/DE.1 is an "A-dev"
4.3/DE.1, 4.4.1/DE.1, 4.5.2/DE.1, 5.2.1/DE.1, 5.6.3.2/DE.1, 5.6.3.3/DE.1, 5.6.4/DE.1, 5.6.5/DE.1, and 9.6.4/DE.2 are "snc".
All other subclauses DE.X are "ncpt".

1 Scope

1.1 General

1.1 DE.1 General

(ncpt) (Supplement to DIN EN 50341-1 (VDE 0210-1):2013-11, clause 1.1)

This EN applies for planning and design of overhead lines with nominal voltages above AC 1 kV.

This EN needs not to be adopted for existing installations. Installations in the planning and construction stage may be completed adopting the standard edition valid at the beginning of planning.

1.2 Field of application

1.2 DE.1 Application for conductors with components for telecommunication

(ncpt) (Supplement to DIN EN 50341-1 (VDE 0210-1):2013-11, 1.2)

In Germany this EN is applicable for all types of conductors (according to the information in clause 1.2) which contain components for telecommunication.

1.2 DE.2 Application for installation of telecommunication equipment on supports

(ncpt) (Supplement to DIN EN 50341-1 (VDE 0210-1):2013-11, 1.2)

In Germany this EN is applicable for the installation of telecommunication equipment on supports. Reference is made to 4.11.1/DE.1 "Extension of utilization".

2 Normative references, definitions and symbols

2.1 Normative references

The following documents which are quoted partly or as a whole in this document are necessary for the application of this document. In case of dated reference only the referred edition is applicable. In case of non-dated references the last edition of the referred document (including all modifications) is applicable.

DAST 022¹⁾, *Guideline of DAST for hot-dip-zink-coating of prefabricated loadbearing steel components*

DAST-Richtlinie – Feuerverzinken von tragenden Stahlbauteilen

DIN 1054:2010-12, *Subsoil – Verification of the safety of earthworks and foundations – Supplementary rules to DIN EN 1997-1:2009-09 + NA:2010-12*

Baugrund – Sicherheitsnachweise im Erd- und Grundbau – Ergänzende Regelungen zu DIN EN 1997-1:2009-09 + NA:2010-12

DIN 4102-7:1998-07, *Fire behaviour of building materials and building components – Part 7: Roofing – Definitions, requirements and testing*

Brandverhalten von Baustoffen und Bauteilen – Teil 7: Bedachungen – Begriffe, Anforderungen und Prüfungen

¹⁾ Source: Stahlbau Verlags- und Service GmbH

DIN 48006-1, *Insulators for overhead lines – Part 1: Long-rod insulators LP with socket caps*
Isolatoren für Starkstrom-Freileitungen – Langstabisolatoren mit Pfannenkappen

DIN 48006-2, *Insulators for overhead lines – Part 2: Long-rod insulators LG with clevis caps*
Isolatoren für Starkstrom-Freileitungen – Langstabisolatoren mit Gabelkappen

DIN 48006-3, *Insulators for overhead lines – Part 3: solid-core (VK) insulators*
Isolatoren für Starkstrom-Freileitungen – Vollkernisolatoren VK

DIN 48200-1, *Copper wires for stranded conductors*
Drähte für Leitungsseile – Drähte aus Kupfer

DIN 48200-2, *Bronze wires for stranded conductors*
Drähte für Leitungsseile – Drähte aus Kupferknetlegierung

DIN 48201-1, *Copper stranded conductors*
Leitungsseile – Seile aus Kupfer

DIN 48201-2, *Bronze stranded conductors*
Leitungsseile – Seile aus Kupfer-Knetlegierungen (Bz)

DIN 48203-1, *Copper wires and copper stranded conductors; technical delivery conditions*
Drähte und Seile für Leitungen aus Kupfer – Technische Lieferbedingungen

DIN 48203-2, *Wrought copper alloy (Bz) wires and conductors; technical delivery conditions*
Drähte und Seile für Leitungen aus Kupferknetlegierungen (Bz) – Technische Lieferbedingungen

DIN VDE 0212-399 (VDE 0212-399), *Conductors for Overhead lines – Conductors of concentric stranded round galvanized steel wires*
Leiter für Freileitungen – Leiter aus konzentrisch verseilten runden verzinkten Stahldrähten

DIN VDE V 0212-490 (VDE V 0212-490):2014-12, *Fittings for overhead lines – Part 490: Components for the protection of birds – Requirements and tests*
Armaturen für Freileitungen – Teil 490: Bauteile für den Vogelschutz – Anforderungen und Prüfungen

DIN EN 10025-1:2005-02, *Hot rolled products of structural steels – Part 1: General technical delivery conditions*
Warmgewalzte Erzeugnisse aus Baustählen – Teil 1: Allgemeine technische Lieferbedingungen

DIN EN 10025-2:2005-04, *Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels*
Warmgewalzte Erzeugnisse aus Baustählen – Teil 2: Technische Lieferbedingungen für unlegierte Baustähle

DIN EN 1090-1, *Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components*
Ausführung von Stahltragwerken und Aluminiumtragwerken – Teil 1: Konformitätsnachweisverfahren für tragende Bauteile

DIN EN 1090-2, *Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures*
Ausführung von Stahltragwerken und Aluminiumtragwerken – Teil 2: Technische Regeln für die Ausführung von Stahltragwerken

DIN EN 12385-4:2008-06 + amendment 1:2009-01, *Steel wire ropes – Safety – Part 4: Stranded ropes for general lifting applications; German version EN 12385-4:2002+A1:2008*
Drahtseile aus Stahldraht – Sicherheit – Teil 4: Litzenseile für allgemeine Hebezwecke; Deutsche Fassung EN 12385-4:2002 + A1:2008

DIN EN 12843:2004-11, *Precast concrete products – Masts and poles; German version EN 12843:2004*

Betonfertigteile – Masten; Deutsche Fassung EN 12843:2004

DIN EN 1991-1-4:2010-12, *Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions; German version EN 1991-1-4:2005 + A1:2010 + AC:2010*

Eurocode 1: Einwirkungen auf Tragwerke – Teil 1-4: Allgemeine Einwirkungen – Windlasten; Deutsche Fassung EN 1991-1-4:2005 + A1:2010 + AC:2010

DIN EN 1991-1-4/NA:2010-12, *National Annex - Nationally determined parameters – Eurocode 1: Actions on structures – Part 1-4: General actions - Wind actions*

Nationaler Anhang – National festgelegte Parameter – Eurocode 1: Einwirkungen auf Tragwerke – Teil 1-4: Allgemeine Einwirkungen – Windlasten

DIN EN 1992-1-1:2011-01, *Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings; German version EN 1992-1-1:2004 + AC:2010*

Eurocode 2: Bemessung und Konstruktion von Stahlbeton- und Spannbetontragwerken – Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau; Deutsche Fassung EN 1992-1-1:2004 + AC:2010

DIN EN 1992-1-1/NA:2013-04, *National Annex – Nationally determined parameters – Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings*

Nationaler Anhang – National festgelegte Parameter – Eurocode 2: Bemessung und Konstruktion von Stahlbeton- und Spannbetontragwerken – Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau

DIN EN 1997-1:2009-09, *Eurocode 7: Geotechnical design – Part 1: General rules; German version EN 1997-1:2004 + AC:2009*

Eurocode 7: Entwurf, Berechnung und Bemessung in der Geotechnik – Teil 1: Allgemeine Regeln; Deutsche Fassung EN 1997-1:2004 + AC:2009

DIN EN 1997-1/NA:2010-12, *National Annex – Nationally determined parameters – Eurocode 7: Geotechnical design – Part 1: General rules*

Nationaler Anhang – National festgelegte Parameter – Eurocode 7: Entwurf, Berechnung und Bemessung in der Geotechnik – Teil 1: Allgemeine Regeln

DIN EN 50182, *Conductors for overhead lines – Round wire concentric lay stranded conductors*

Leiter für Freileitungen – Leiter aus konzentrisch verseilten runden Drähten

DIN EN 50183, *Conductors for overhead lines – Aluminium-magnesium-silicon alloy wire for overhead line conductors*

Leiter für Freileitungen – Drähte aus Aluminium-Magnesium-Silizium-Legierung

DIN EN 50189, *Conductors for overhead lines – Zinc coated steel wires for stranded conductors*

Leiter für Freileitungen – Verzinkte Stahldrähte

DIN EN 50341-1 (VDE 0210-1):2013-11, *Overhead electrical lines exceeding AC 1 kV – Part 1: General requirements – Common specifications; German version EN 50341-1:2012*

Freileitungen über AC 1 kV – Teil 1: Allgemeine Anforderungen – Gemeinsame Festlegungen; Deutsche Fassung EN 50341-1:2012

DIN EN 50413 (VDE 0848-1):2009-08, *Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz - 300 GHz); German version EN 50413:2008*

Grundnorm zu Mess- und Berechnungsverfahren der Exposition von Personen in elektrischen, magnetischen und elektromagnetischen Feldern (0 Hz bis 300 GHz); Deutsche Fassung EN 50413:2008

DIN EN 50443 (VDE 0845-8):2012-08, *Effects of electromagnetic interference on pipelines caused by high voltage AC electric traction systems and/or high-voltage AC power supply systems; German version EN 50443:2011*

Auswirkungen elektromagnetischer Beeinflussungen von Hochspannungswechselstrombahnen und/oder Hochspannungsanlagen auf Rohrleitungen; Deutsche Fassung EN 50443:2011

DIN EN 50522 (VDE 0101-2):2011-11, *Earthing of power installations exceeding 1 kV AC, German version EN 50522:2010*

Erdung von Starkstromanlagen mit Nennwechselspannungen über 1 kV; Deutsche Fassung EN 50522: 2010

DIN EN 60038 (VDE 0175-1):2012-04, *CENELEC standard voltages (IEC 60038:2009, modified); German version EN 60038:2011*

CENELEC-Normspannungen (IEC 60038:2009, modifiziert); Deutsche Fassung EN 60038:2011

DIN IEC 60273 (VDE 0674-4):1993-08, *Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1 000 V (IEC 60273:1990); German version HD 578 S1:1992*

Kenngößen von Innenraum- und Freiluft-Stützisolatoren für Systeme mit Nennspannungen über 1 000 V (IEC 60273:1990); Deutsche Fassung HD 578 S1:1992

DIN EN 60383-1 (VDE 0446-1):1997-05, *Insulators for overhead lines with a nominal voltage above 1 kV – Part 1: Ceramic or glass insulator units for AC systems – Definitions, test methods and acceptance criteria (IEC 60383-1:1993); German version EN 60383-1:1996*
Isolatoren für Freileitungen mit einer Nennspannung über 1 kV – Teil 1: Keramik- oder Glas-Isolatoren für Wechselspannungssysteme – Begriffe, Prüfverfahren und Annahmekriterien (IEC 60383-1:1993); Deutsche Fassung EN 60383-1:1996

DIN EN 60433 (VDE 0446-7), *Insulators for overhead lines with a nominal voltage above 1 kV – Ceramic insulators for AC systems – Characteristics of insulator units of the long rod type*

Isolatoren für Freileitungen mit einer Nennspannung über 1 kV – Keramik-Isolatoren für Wechselspannungssysteme – Kenngößen von Kettenisolatoren in Langstabausführung

DIN EN 60865-1 (VDE 0103):2012-09, *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods (IEC 60865-1:2011); German version EN 60865-1:2012*
Kurzschlussströme – Berechnung der Wirkung – Teil 1: Begriffe und Berechnungsverfahren (IEC 60865-1:2011); Deutsche Fassung EN 60865-1:2012

DIN EN 60889, *Hard-drawn aluminium wire for overhead line conductors*
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DIN EN 61109 (VDE 0441-100), *Insulators for overhead lines – Composite suspension and tension insulators for AC systems with a nominal voltage greater than 1000 V – Definitions, test methods and acceptance criteria*

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DIN EN 61854 (VDE 0212-2), *Overhead lines – Requirements and tests for spacers*
Freileitungen – Anforderungen und Prüfungen für Feldabstandhalter

DIN EN 61897 (VDE 0212-3), *Overhead lines – Requirements and tests for Stockbridge type aeolian vibration dampers*
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DIN EN 61952 (VDE 0441-200):2009-06, *Insulators for overhead lines – Composite line post insulators for A.C. systems with a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria (IEC 61952:2008)*
Isolatoren für Freileitungen – Verbund-Freileitungsstützer für Wechselstromsysteme mit einer Nennspannung über 1 000 V – Begriffe, Prüfverfahren und Annahmekriterien (IEC 61952:2008); Deutsche Fassung EN 61952:2008

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DIN EN ISO 1461, *Hot-dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*
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Eurocode 3: Bemessung und Konstruktion von Stahlbauten – Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau

DIN EN 1993-1-5, *Eurocode 3: Design of steel structures – Part 1-5: Plated structural elements*
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DIN EN 1993-1-6, *Eurocode 3: Design of steel structures – Part 1-6: Strength and stability of shell structures*
Eurocode 3: Bemessung und Konstruktion von Stahlbauten – Teil 1-6: Festigkeit und Stabilität von Schalen

DIN EN 1995-1-1, *Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings*
Eurocode 5: Bemessung und Konstruktion von Holzbauten – Teil 1-1: Allgemeines – Allgemeine Regeln und Regeln für den Hochbau

DIN EN 1995-1-2, *Eurocode 5: Design of timber structures – Part 1-2: General – Structural fire design*
Eurocode 5: Bemessung und Konstruktion von Holzbauten – Teil 1-2: Allgemeine Regeln – Tragwerksbemessung für den Brandfall

DIN VDE 0100-442 (VDE 0100-442):2013-06, *Low-voltage electrical installations – Part 4-442: Protection for safety – Protection of low-voltage installations against temporary overvoltages due to earth faults in the high-voltage system and due to faults in the low-voltage system (IEC 60364-4-44:2007 (Clause 442), modified); German implementation HD 60364-4-442:2012*
Errichten von Niederspannungsanlagen – Teil 4-442: Schutzmaßnahmen – Schutz von Niederspannungsanlagen bei vorübergehenden Überspannungen infolge von Erdschlüssen im Hochspannungsnetz und bei Fehlern im Niederspannungsnetz (IEC 60364-4-44:2007 (Abschnitt 442), modifiziert); Deutsche Übernahme HD 60364-4-442:2012

DIN VDE 0105-100 (VDE 0105-100), *Operation of electrical installations – Part 100: General requirements*

Betrieb von elektrischen Anlagen – Teil 100: Allgemeine Festlegungen

DIN VDE 0105-115 (VDE 0105-115), *Operation of electrical installations – Part 115: Particular requirements for agricultural plants*

Betrieb von elektrischen Anlagen – Besondere Festlegungen für landwirtschaftliche Betriebsstätten

DIN VDE 0845-6-1 (VDE 0845-6-1):2013-04, *Influence of high-voltage systems on telecommunication systems – Part 1: General, limits, calculation and measurement methods*
Maßnahmen bei Beeinflussung von Telekommunikationsanlagen durch Starkstromanlagen – Teil 1: Grundlagen, Grenzwerte, Berechnungs- und Messverfahren

DIN VDE 0845-6-2 (VDE 0845-6-2):2014-09, *Electromagnetic influence of electric power supply on telecommunication systems – Part 2: Influence by three phase ac systems*
Maßnahmen bei Beeinflussung von Telekommunikationsanlagen durch Starkstromanlagen – Teil 2: Beeinflussung durch Drehstromanlagen

VDE-AR-N 4210-11 (VDE-AR-N 4210-11):2011-08²⁾, *Protection of birds on medium voltage overhead lines*

Vogelschutz an Mittelspannungsfreileitungen

Impregnated timber poles – Technical reference (FNN)
Imprägnierte Holzmaste – Technischer Hinweis (FNN)³⁾

2.2 Definitions

The terms and definitions listed in DIN EN 50341-1 (VDE 0210-1):2013-11 are supplemented and detailed for the purpose of this Part 2-4 as follows.

2.2 DE.1

Overhead line

(ncpt) the total of a system for overhead transmission of electrical energy consisting of supports and line components.

Note 1 to entry: Supports comprise towers, their foundations and earthings. Line components comprise overhead conductors and insulators together with their fittings.

2.2 DE.2

Tower and pole

(ncpt) part of the support consisting of tower body, earthwire peaks and crossarms.

Note 1 to entry: According to 2.2/DE.2.1 to DE.2.7 they serve for the following functions.

DE.2.1

Suspension towers

tower, which supports the conductors in a straight line

DE.2.2

Angle suspension tower

tower, which serves as suspension support for the conductors, where the line changes direction

²⁾ Source: VDE-VERLAG GMBH

³⁾ Source: VDE-InfoCenter - Verbandsgeschäftsstelle