

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 50341-2-4:2019 sisaldab Euroopa standardi EN 50341-2-4:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 50341-2-4:2019 consists of the English text of the European standard EN 50341-2-4:2019.
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.
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EUROPEAN STANDARD

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NORME EUROPÉENNE

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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 2019-04-10.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, 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

Contents

	Page
European foreword	6
1 Scope	7
1.1 General	7
1.2 Field of application	7
2 Normative references, definitions and symbols	7
2.1 Normative references	7
2.2 Definitions	13
2.3 Symbols	18
3 Basis of design	23
3.2 Requirements of overhead lines	23
3.2.1 Basic requirements	23
3.2.2 Reliability requirements	23
3.2.5 Strength coordination	23
3.2.6 Additional considerations	23
3.4 Actions	24
3.4.3 Classification of actions by their nature and/or the structural response	24
3.6 Design values	24
3.6.3 Design value of a material property	24
3.6.4 Combination value of a variable action	24
4 Actions on lines	25
4.1 Introduction	25
4.3 Wind loads	25
4.4 Wind forces on overhead line components	27
4.4.1 Wind forces on conductors	27
4.4.2 Wind forces on insulator sets	29
4.4.3 Wind forces on lattice towers	30
4.4.4 Wind forces on poles	32
4.5 Ice loads	32
4.5.2 Ice forces on conductors	32
4.6 Combined wind and ice loads	34
4.6.4 Equivalent diameter D_I of ice-covered conductor	34
4.6.6 Combination of wind velocities and ice loads	34
4.8 Security loads	34
4.8.1 General	34
4.9 Safety loads	34
4.9.1 Construction and maintenance loads	34
4.9.2 Loads related to the weight of lines men	35
4.10 Forces due to short-circuit currents	35
4.11 Other special forces	35
4.12 Load cases	35
4.12.1 General	35
4.12.2 Standard load cases	36
4.13 Partial factors for actions	39
5 Electrical requirements	40
5.2 Currents	40
5.2.1 Normal current	40
5.4 Classification of voltages and over-voltages	40

	Page
5.4.2 Representative power frequency voltages	40
5.4.5 Representative fast-front overvoltage	40
5.5 Minimum air clearance distances to avoid flashovers	40
5.5.3 Empirical method based on European experience	40
5.6 Load cases for calculation of clearances	41
5.6.3 Wind loads for determination of electric clearances	41
5.6.4 Ice loads for the determination of electric clearances	41
5.6.5 Combined wind and ice loads	42
5.8 Internal clearances within the span and at the top of support	42
5.9 External clearances	43
5.9.1 General	43
5.9.2 External clearances to ground in areas remote from buildings, roads etc.	45
5.9.3 External clearances to residential and other buildings	46
5.9.4 External clearances to crossing traffic routes	47
5.9.5 External clearances to adjacent traffic routes	48
5.9.6 External clearances to other power lines or overhead telecommunication lines	48
5.11 Electric and magnetic fields	49
5.11.1 Electric and magnetic fields under a line	49
5.11.2 Electric and magnetic field induction	49
5.11.3 Interference with telecommunication circuits	49
6 Earthing systems	49
6.1 Introduction	49
6.1.2 Requirements for dimensioning of earthing systems	49
6.1.3 Earthing measures against lightning effects	51
6.3 Rating with regard to thermal strength	51
6.3.2 Current rating calculation	51
6.4 Dimensioning with regard to human safety	52
6.4.2 Touch voltage limits at different locations	52
6.4.3 Basic design of earthing systems with regard to permissible touch voltage	52
6.4.4 Measures in systems with isolated neutral or resonant earthing	53
6.5 Site inspection and documentation of earthing systems	53
7 Supports	54
7.1 Initial design considerations	54
7.2 Materials	54
7.2.1 Steel materials, bolts, nuts and washers, welding consumables	54
7.2.6 Wood	54
7.2.8 Other materials	54
7.3 Lattice steel towers	55
7.3.1 General	55
7.3.5 Structural analysis	55
7.3.6 Ultimate limit states	55
7.3.8 Resistance of connections	56
7.4 Steel poles	57
7.4.1 General	57
7.4.5 Structural analysis	57
7.4.6 Ultimate limit states (EN 1993-1-1:2005 – Chapter 6)	57
7.4.7 Serviceability limit states	58
7.4.8 Resistance of connections	58

	Page
7.5 Wood poles	58
7.5.2 Basis of design	58
7.5.3 Materials	59
7.5.5 Ultimate limit states	59
7.5.6 Serviceability limit states	59
7.5.7 Resistance of connections	59
7.6 Concrete poles	59
7.6.2 Basis of Design	59
7.6.4 Ultimate limit states	60
7.6.5 Serviceability limit states	60
7.7 Guyed structures	60
7.7.1 General	60
7.7.3 Materials	60
7.8 Other structures	61
7.9 Corrosion protections and finishes	61
7.9.1 General	61
7.9.2 Galvanising	61
7.9.4 Paint over galvanising in plant (Duplex system)	61
7.9.7 Protection of wood poles	61
7.10 Maintenance facilities	61
7.10.1 Climbing	61
7.10.2 Maintainability	63
7.10.3 Safety requirements	63
8 Foundations	63
8.2 Basis of geotechnical design	63
8.2.2 Geotechnical design by calculation	63
8.2.3 Design by prescriptive measures	64
8.2.4 Load tests and tests on experimental models	64
8.6 Interaction between support foundations and soil	64
9 Conductors and earth wires	64
9.2 Aluminium based conductors	64
9.2.1 Characteristics and dimensions	64
9.2.3 Conductor service temperatures and grease characteristics	65
9.3 Steel based conductors	66
9.3.1 Characteristics and dimensions	66
9.3.3 Conductor service temperatures and grease characteristics	66
9.3.4 Mechanical requirements	67
9.6 General requirements	67
9.6.2 Partial factors for conductors	67
9.6.3 Minimum cross sections	68
9.6.4 Sag-tension calculations	68
10 Insulators	69
10.1 Introduction	69
10.4 Pollution performance requirements	70
10.7 Mechanical requirements	70
11 Hardware	73
11.1 Introduction	73
11.2 Electrical requirements	73

	Page
11.2.1 Requirements applicable to all fittings.....	73
11.2.2 Requirements applicable to current carrying fittings	73
11.6 Mechanical requirements	73
12 Quality assurance, checks and taking-over	75
Annex G (normative) Calculation methods for earthing systems	76
G.4 Touch voltage and body current.....	76
G.4.1 Equivalence between touch voltage and body current	76
Annex J (normative) Angles in lattice steel towers	77
J.2 General.....	77
J.3 Tensile resistance of angles connected through one leg.....	77
J.4 Buckling resistance of angles in compression	78
J.4.1 Flexural buckling resistance	78
J.4.2 Effective non-dimensional slenderness for flexural buckling	79
J.4.2.4 Effective non-dimensional slenderness $\bar{\lambda}_{\text{eff}}$	79
J.4.3 Slenderness of members	79
J.4.3.2 Leg members and chords	79
J.4.3.3 Primary bracing pattern	80
J.4.3.4 Compound members.....	84
J.4.4 Secondary (or redundant) bracing members	85
J.5 Design resistance of bolted connections.....	85
J.5.1 General.....	85
Annex M (informative) Geotechnical and structural design of foundations	86
M.3 Sample semi-empirical models for resistance estimation	86
M.3.1 Geotechnical design by calculation	86
M.3.1.1 General.....	86
M.3.1.2 Monoblock foundations	86
M.3.1.3 Slab foundations.....	86
M.3.1.4 Grillage-type slab foundations.....	86
M.3.1.5 Single-pile foundations.....	87
M.3.1.6 Separate stepped block foundations, pad and chimney foundations	87
M.3.1.9 Pile foundations.....	87
M.3.2 Structural design of concrete foundations	87
Annex AA (informative) Assumptions for ice loads	88
Literature.....	90

Figures

Figure 4/DE.1 – Map of wind zones for the Federal Republic of Germany according to DIN EN 1991-1-4/NA:2010-12.....	26
Figure 4/DE.2 – Wind action on conductors and resulting wind force in any wind direction.....	28
Figure 4/DE.3 – Wind action on towers.....	32
Figure 5/DE.1 – Description of the wake behind a wind energy converter, where $\tan \beta = 0,1$ shall be assumed.....	47
Figure 6/DE.1 – Separated earthing systems with connection via an overhead line	50
Figure 6/DE.2 – Separated earthing systems with connection via cable.	51
Figure J.4/DE.1 – Slenderness λ of leg members.....	80
Figure J.4/DE.2 – Usual diagonal bracings	81
Figure J.4/DE.3 – Application of secondary and spatial bracing systems.....	81
Figure AA.1 – Ice load zone map for the German Federal Republic (informative)	89

Tables

Table 3/DE.1 – Material partial factors for towers and poles	24
Table 4/DE.1 – Aerodynamic drag factors c_x	29
Table 5/DE.1 – Nominal voltages in 380 kV systems and related maximum operational voltages and maximum voltage for equipment	40
Table 5/DE.2 – Nominal voltages in the grid and voltage-related minimum clearances	46
Table 6/DE.1 – Cumulative frequency of lightning currents on towers of lines with shield wires	51
Table 6/DE.2 – Decisive currents for rating of the earthing system	52
Table 7/DE.1 – Dimensions of connections and edge distances of jointing components	57
Table 9/DE.1 – Mechanical characteristics, permissible everyday stress for standard conductors according to DIN EN 50182:2001-12	65
Table 9/DE.2 – Permissible conductor temperature in case of short-circuit load for conductors using aluminium as conducting material	66
Table 9/DE.3 – Permissible conductor temperature in case of short-circuit load for conductor made of steel	67
Table 9/DE.4 – Mechanical characteristics, permissible everyday stresses for standardized conductors made of steel wires according to DIN VDE 0212-399 (VDE 0212-399) and to DIN EN 50182:2001-12	67
Table 9/DE.5 – Minimum cross sections	68
Table 10/DE.1 – Material partial factors for insulators	72

European foreword

The following statements 1 to 6 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)
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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 50341-2-4:2019 with EN 50341-1:2012. It performed the necessary checks in the frame of quality assurance/control. However, it is noted that this quality control was made in the framework of the general responsibility of a standards committee under the national laws/regulations.

- 3 This EN 50431-2-4, hereafter referred to as Part 2-4, is normative in Germany and informative in other countries.

- 4 This Part 2-4 shall 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", shall be read as amendments to the relevant text in Part 1. Any necessary clarification regarding the application of this 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 in this 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, 5.4.5/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.1 are "snc".
All other subclauses DE.X are "ncpt".

This second edition replaces the first edition published in 2016.

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

- the positions with a technical change have a vertical line in the left margin for identification and
- editorial changes were shaded words.

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 to planning and installation of overhead lines with nominal voltages above AC 1 kV.

This EN needs not to be adopted to 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 to 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 to all types of conductors (according to the information in clause 1.2) which contain components for telecommunication.

1.2 DE.2 Application to 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 to the installation of telecommunication equipment on overhead line 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-zinc-coating of prefabricated load-bearing 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, *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

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

¹ SOURCE: Stahlbau Verlags- und Service GmbH, Sohnstraße 65, 40237 Düsseldorf.

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 insulators*
Isolatoren für Starkstrom-Freileitungen – Vollkernisolatoren VK

DIN EN 338:2016-07, *Structural timber – Strength classes; German version EN 338:2016*
Bauholz für tragende Zwecke – Festigkeitsklassen; Deutsche Fassung EN 338:2016

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 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 1993-1-1, *Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings*
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*
Eurocode 3: Bemessung und Konstruktion von Stahlbauten – Teil 1-5: Plattenförmige Bauteile

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 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 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; Deutsche Fassung EN 10025-1:2004

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; Deutsche Fassung EN 10025-2:2004

DIN EN 12385-4, *Steel wire ropes – Safety – Part 4: Stranded ropes for general lifting applications*

Drahtseile aus Stahldraht – Sicherheit – Teil 4: Litzenseile für allgemeine Hebezwecke

DIN EN 12843, *Precast concrete products – Masts and poles*

Betonfertigteile – Maste

DIN EN 14229, *Structural timber – Wood poles for overhead lines*

Holzbauwerke – Holzmaste für Freileitungen

DIN EN 50182:2001-12, *Conductors for overhead lines – Round wire concentric lay stranded conductors, Deutsche Fassung EN 50182:2001*

Leiter für Freileitungen – Leiter aus konzentrisch verseilten runden Drähten, Deutsche Fassung EN 50182:2001

DIN EN 50183, *Conductors for overhead lines – Aluminium-magnesium-silicon alloy wires 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), *Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz – 300 GHz)*
Grundnorm zu Mess- und Berechnungsverfahren der Exposition von Personen in elektrischen, magnetischen und elektromagnetischen Feldern (0 Hz bis 300 GHz)

DIN EN 50443 (VDE 0845-8), *Effects of electromagnetic interference on pipelines caused by high voltage AC electric traction systems and/or high-voltage AC power supply systems*
Auswirkungen elektromagnetischer Beeinflussungen von Hochspannungswechselstrombahnen und/oder Hochspannungsanlagen auf Rohrleitungen

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 EN 60071-2 (VDE 0111-2):1997-09, *Insulation coordination – Part 2: Application guide (IEC 60071-2:1996); German version EN 60071-2:1997*
Isolationskoordination – Teil 2: Anwendungsrichtlinie (IEC 60071-2:1996); Deutsche Fassung EN 60071-2:1997

DIN EN 60305 (VDE 0446-6), *Insulators for overhead lines with a nominal voltage above 1 kV – Ceramic or glass insulator units for a.c. systems – Characteristics of insulator units of the cap and pin type*
Isolatoren für Freileitungen mit einer Nennspannung über 1 000 V – Keramik- oder Glas-Kettenisolatoren für Wechselstromsysteme – Kenndaten von Kettenisolatoren vom Typ Kappenisolator

DIN EN 60383-1 (VDE 0446-1), *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*
Isolatoren für Freileitungen mit einer Nennspannung über 1 kV – Teil 1: Keramik- oder Glas-Isolatoren für Wechselspannungssysteme – Begriffe, Prüfverfahren und Annahmekriterien

DIN EN 60865-1 (VDE 0103), *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods*
Kurzschlussströme – Berechnung der Wirkung – Teil 1: Begriffe und Berechnungsverfahren

DIN EN 60889, *Hard-drawn aluminium wire for overhead line conductors*
Hartgezogene Aluminiumdrähte für Leiter von Freileitungen

DIN EN 61109 (VDE 0441-100), *Insulators for overhead lines – Composite suspension and tension insulators for AC systems with a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria*
Isolatoren für Freileitungen – Verbund-Hänge- und -Abspannisolatoren für Wechselstromsysteme mit einer Nennspannung über 1 000 V – Begriffe, Prüfverfahren und Annahmekriterien

DIN EN 61232, *Overhead lines – Aluminium-clad steel wires for electrical purposes*
Freileitungen – Aluminium-ummantelte Stahldrähte für die Elektrotechnik

DIN EN 61284 (VDE 0212-1), *Overhead lines – Requirements and tests for fittings*
Freileitungen – Anforderungen und Prüfungen für Armaturen

DIN EN 61466-1 (VDE 0674-103-1), *Composite string insulator units for overhead lines with a nominal voltage greater than 1 000 V – Part 1: Standard strength classes and end fittings*
Verbund-Kettenisolatoren für Freileitungen mit einer Nennspannung über 1 000 V – Teil 1: Genormte Festigkeitsklassen und Endarmaturen

DIN EN 61466-2 (VDE 0441-5)², *Composite string insulator units for overhead lines with a nominal voltage greater than 1 kV – Part 2: Dimensional and electrical characteristics*
Verbund-Kettenisolatoren für Freileitungen mit einer Nennspannung über 1 000 V – Teil 2: Maße und elektrische Kenngrößen

DIN EN 61952 (VDE 0441-200), *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*

Isolatoren für Freileitungen – Verbund-Freileitungsstützer für Wechselstromsysteme mit einer Nennspannung über 1 000 V – Begriffe, Prüfverfahren und Annahmekriterien

DIN EN 62004 (VDE 0212-303), *Thermal-resistant aluminium alloy wires for overhead line conductors*

Wärmebeständige Drähte aus Aluminiumlegierung für Leiter von Freileitungen

DIN EN 62305-2 Beiblatt 1 (VDE 0185-305-2 Beiblatt 1), *Protection against lightning – Part 2: Risk management – Supplement 1: Lightning threat in Germany*
Blitzschutz – Teil 2: Risiko-Management – Beiblatt 1: Blitzgefährdung in Deutschland

DIN EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread*

Mechanische Eigenschaften von Verbindungselementen aus Kohlenstoffstahl und legiertem Stahl – Teil 1: Schrauben mit festgelegten Festigkeitsklassen – Regelgewinde und Feingewinde

DIN EN ISO 1461, *Hot-dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

Durch Feuerverzinken auf Stahl aufgebrachte Zinküberzüge (Stückverzinken) – Anforderungen und Prüfungen

DIN EN ISO 12944 (all parts), *Paints and varnishes – Corrosion protection of steel structures by protective paint systems*

Beschichtungsstoffe – Korrosionsschutz von Stahlbauten durch Beschichtungssysteme

DIN EN ISO 12944-4, *Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 4: Types of surface and surface preparation*

Beschichtungsstoffe – Korrosionsschutz von Stahlbauten durch Beschichtungssysteme – Part 4: Arten von Oberflächen und Oberflächenvorbereitung

DIN IEC 60273 (VDE 0674-4), *Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1 000 V*

Kenngrößen von Innenraum- und Freiluft-Stützisolatoren für Systeme mit Nennspannungen über 1 000 V

² A consolidated version of IEC 61466-2, Ed. 1.2, was published 2018-05-09: IEC 61466-2:1998 + A1:2002 + A2:2018. The German standard DIN EN 61466-2 (VDE 0674-103-2) is in preparation.

DIN IEC/TS 60815-1 (VDE V 0674-256-1), *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

Auswahl und Bemessung von Hochspannungsisolatoren für die Anwendung unter Verschmutzungsbedingungen – Teil 1: Begriffe, Informationen und allgemeine Grundlagen

DIN IEC/TS 60815-2 (VDE V 0674-256-2), *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for a.c. systems*

Auswahl und Bemessung von Hochspannungsisolatoren für die Anwendung unter Verschmutzungsbedingungen – Teil 2: Keramik- und Glasisolatoren für Wechselspannungssysteme

DIN IEC/TS 60815-3 (VDE V 0674-256-3), *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 3: Polymer insulators for a.c. systems*

Auswahl und Bemessung von Hochspannungsisolatoren für die Anwendung unter Verschmutzungsbedingungen – Teil 3: Polymerisolatoren für Wechselspannungssysteme

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 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), *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 VDE 0845-6-1 (VDE 0845-6-1) *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), *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):2011-08³, *Protection of birds on medium voltage overhead lines*

Vogelschutz an Mittelspannungsfreileitungen

Impregnated timber poles – Technical reference (FNN)

*Imprägnierte Holzmaste – Technischer Hinweis (FNN)*⁴

Twentysixth regulation on application of the German Federal Republic Emission Protection Law (Regulation on electro-magnetic fields, version according to the announcement of August 14, 2013 (BGBl p. 3266)

Sechszwanzigste Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (Verordnung über elektromagnetische Felder in der Fassung der Bekanntmachung vom 14. August 2013 (BGBl. I S. 3266) – 26. BImSchV)

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: Depending on the function within a line the towers and poles can be discerned according to 2.2/DE.2.1 to DE.2.7.

DE.2.1

Suspension tower

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

DE.2.3

Angle tower

tower, which carries the resulting tensile forces at a point where the line changes direction

DE.2.4

Section tower and angle section tower

tower, which carries the conductor tensile force in line direction or in the resultant direction, respectively, and serves additionally as a rigid point in the line

DE.2.5

Dead end tower

tower, which carries the total conductor tensile forces in line direction on one side

³ SOURCE: VDE-VERLAG GMBH

⁴ SOURCE: VDE-InfoCenter – Verbandsgeschäftsstelle (actual version: version no. 6, 2011-10)