



# SLOVENSKI STANDARD SIST EN 50341-2-22:2016

01-september-2016

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**Nadzemni električni vodi za izmenične napetosti nad 1 kV - 2-22. del: Nacionalna normativna določila (NNA) za Poljsko (na podlagi EN 50341-1:2012)**

Overhead electrical lines exceeding AC 1 kV - Part 2-22: National Normative Aspects (NNA) for Poland (based on EN 50341-1:2012)

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Ta slovenski standard je istoveten z: **SIST EN 50341-2-22:2016** **EN 50341-2-22:2016**  
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**ICS:**

29.240.20      Daljnovodi      Power transmission and  
distribution lines

**SIST EN 50341-2-22:2016**

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EUROPEAN STANDARD

**EN 50341-2-22**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2016

ICS 29.240.20

English Version

Overhead electrical lines exceeding AC 1 kV - Part 2-22:  
National Normative Aspects (NNA) for Poland (based on EN  
50341-1:2012)

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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.

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

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## European foreword

1. The Polish Committee for Standardization (NC) is identified by the following address:

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Name of the relevant technical body: Komitet Techniczny nr 80 (KT 80) "ds. Ogólnych w Sieciach Elektroenergetycznych" (General of Overhead Electrical Lines)

2. The Polish NC and its technical body KT 80 "for General of Overhead Electrical Lines" has prepared this Part 2-22 of EN 50341, listing the Polish National Normative Aspects (NNA), under its sole responsibility, and duly passed it through the CENELEC and CLC/TC11 procedures.

NOTE: The Polish NC also takes sole responsibility for the technically correct co-ordination of this EN 50341-2-22 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.

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3. This NNA is normative in Poland and informative for other countries.
4. This Part 2-22 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 "PL", are to 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 Polish NC who will, in co-operation with CLC/TC11, clarify the requirements.

Where no reference is made in this NNA to a specific sub-clause, then Part 1 shall apply.

5. In the case of "boxed values" defined in Part 1, amended values (if any), which are defined in this NNA, shall be taken into account in Poland. However any boxed value whether in Part 1 or in this NNA, shall not be amended in the direction of greater risk in a Project Specification
6. The Polish standards/ regulations, related to overhead electrical lines exceeding 1 kV (AC) are listed in subclause 2.1.

NOTE: All national standards referred to in this Part 2-22 will be replaced by the relevant European Standards as soon as they become available and are declared by the Polish NC to be applicable and thus reported to the secretary of CLC/TC 11.

## 1. Scope

### 1.1 General

#### (ncpt) PL.1 Scope of application

This NNA determines the requirements which shall be fulfilled while designing and constructing of new overhead lines with nominal system voltages exceeding 1 kV AC. The scope of use of this NNA for temporary lines shall be determined by the Project Specification. For modernisations, reconstructions and refurbishments of the existing lines, the scope and the requirement to comply with PN-EN-50341-1, together with this NNA, shall be determined by the Project Specification.

### 1.2 Field of application

#### (ncpt) PL.1 Overhead lines with covered conductors

This NNA applies to overhead lines with covered conductors and overhead insulated cable system with nominal voltage exceeding 1 kV up to 45 kV AC. Additional requirements and simplifications, which apply only to this range of voltages, have been determined.

This NNA does not contain requirements applicable for designing and constructing overhead lines with nominal voltage exceeding 45 kV AC, with covered conductors, where internal and external clearances can be smaller than specified in the NNA.

#### (ncpt) PL.2 Optical conductors/wires

This NNA also applies to optical phase conductors (OPCON) and optical ground wires (OPGW), containing optical fibre telecommunication circuits, installed on overhead line supports.

#### (ncpt) PL.3 All Dielectric Self Supporting (ADSS) cables

This NNA applies to all – dielectric cables (ADSS) only within the scope of their influence on the load of the support and the requirements of the insulator clearances.

#### (ncpt) PL.4 Installation of telecommunication fittings

The NNA also applies to the installation of telecommunication equipment mounted on the new line structures with their primary function as of overhead line supports.

## 2. Normative references, definitions and symbols

### 2.1 Normative references

This Polish NNA contains provisions of additional standards and national regulations (apart from those specified in Part 1 of the Standard), which were invoked in the text of the NNA.

The specification of those standards and regulations and Polish versions of Euro codes (PN-EN instead of EN) were presented in the table below; with the provision that the user of the NNA for Poland should check their validity and use the latest editions. There is also a necessity of checking the validity of the national Acts and Regulations specified in item 2.2.

#### Eurocodes

Reference	Title
PN-EN 1990:2004	<i>Eurokod: Podstawy projektowania konstrukcji</i> Eurocode: Basic principles of structural design
PN-EN 1991-1-4:2008	<i>Eurokod 1: Oddziaływania na konstrukcje – Część 1-4: Oddziaływania ogólne – Oddziaływania wiatru</i> Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions
PN-EN 1991-1-6:2007	<i>Eurokod 1: Oddziaływania na konstrukcje -- Część 1-6: Oddziaływania ogólne -- Oddziaływania w czasie wykonywania konstrukcji</i> Eurocode 1: Actions on structures – Part 1-6: General actions – actions during execution
PN-EN 1992-1-1:2008	<i>Eurokod 2: Projektowanie konstrukcji z betonu -- Część 1-1: Reguły</i>

	<i>ogólne i reguły dla budynków</i> Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings
PN-EN 1993-1-1:2006	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 1-1: Reguły ogólne i reguły dla budynków</i> Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings
PN-EN 1993-1-3:2008	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 1-3: Reguły ogólne -- Reguły uzupełniające dla konstrukcji z kształtowników i blach profilowanych na zimno</i> Eurocode 3: Design of steel structures – Part 1-3: General rules – Supplementary rules for cold formed members and sheeting
PN-EN 1993-1-5:2008	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 1-5: Blachownice</i> Eurocode 3: Design of steel structures – Part 1-5: Plated structural elements
PN-EN 1993-1-6:2009	<i>Projektowanie konstrukcji stalowych – Część 1-6: Wytrzymałość i stateczność konstrukcji powłokowych</i> Design of steel structures – Part 1-6: Strength and stability of shell structures
PN-EN 1993-1-8:2006	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 1-8: Projektowanie węzłów</i> Eurocode 3: Design of steel structures – Part 1-8: Design of joints
PN-EN 1993-1-11:2008	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 1-11: Konstrukcje ciągnowe</i> Eurocode 3: Design of steel structures – Part 1-11: Design of structures with tension components
PN-EN 1993-3-1:2008	<i>Eurokod 3: Projektowanie konstrukcji stalowych -- Część 3-1: Wieże, maszty i kominy - Wieże i maszty</i> Eurocode 3: Design of steel structures – Part 3-1: Towers, masts and chimneys - Towers and masts
PN-EN 1995-1-1:2010	<i>Eurokod 5: Projektowanie konstrukcji drewnianych -- Część 1-1: Zasady ogólne i zasady dla budynków</i> Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings
PN-EN 1997-1:2008	<i>Eurokod 7: Projektowanie geotechniczne -- Część 1: Zasady ogólne</i> Eurocode 7: Geotechnical design - Part 1: General rules
PN-EN 1997-2:2008	<i>Eurokod 7: Projektowanie geotechniczne -- Część 2: Rozpoznanie i badanie podłoża gruntowego</i> Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing
PN-EN 1998-6:2005E	<i>Eurokod 8: Projektowanie konstrukcji poddanych oddziaływaniom sejsmicznym – Część 6: Wieże, maszty i kominy</i> Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
PN-EN 10020:2003	<i>Definicja i klasyfikacja gatunków stali</i> Definition and classification of steel grades
PN-EN 10025-1:2007	<i>Wyroby walcowane na gorąco ze stali konstrukcyjnych -Część 1: Ogólne warunki techniczne dostawy</i> Hot rolled products of structural steels – Part 1: General technical delivery conditions

PN-EN 10025-2:2007	<p><i>Wyroby walcowane na gorąco ze stali konstrukcyjnych -Część 2: Ogólne warunki techniczne dostawy stali konstrukcyjnych niestopowych</i></p> <p>Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels</p>
PN-EN 1090-1:2009	<p><i>Wykonanie konstrukcji stalowych i aluminiowych Część 1: Zasady oceny zgodności elementów konstrukcyjnych</i></p> <p>Execution of steel and aluminium structures – Part 1: Requirements for conformity assessment of structural components</p>
PN-EN 1090-2:2009	<p><i>Wykonanie konstrukcji stalowych i aluminiowych Część 2: Wymagania techniczne dotyczące konstrukcji stalowych</i></p> <p>Execution of steel and aluminium structures – Part 2: – Technical requirements for the execution of steel structures</p>
PN-EN 12843:2008	<p><i>Prefabrykaty z betonu – Maszty i słupy</i></p> <p>Precast concrete products - Masts and poles</p>
PN-EN 14229:2010E	<p><i>Drewno konstrukcyjne – Słupy drewniane do linii napowietrznych</i></p> <p>Structural timber - Wood poles for overhead lines</p>
PN-EN 60305:2007	<p><i>Izolatory do linii napowietrznych o znamionowym napięciu powyżej 1 kV</i></p> <p><i>Ceramiczne i szklane izolatory do sieci prądu przemiennego – Właściwości izolatorów kołpakowych</i></p> <p>Insulators for overhead lines with a nominal voltage above 1 kV - Ceramic or glass insulator units for AC systems - Characteristics of insulator units of the cap and pin type</p>
PN-EN 60652:2006	<p><i>Badania obciążeniowe konstrukcji wsporczych linii napowietrznych</i></p> <p>Loading tests on overhead line structures</p>
PN-EN 61109:2010P	<p><i>Izolatory do linii napowietrznych</i></p> <p><i>Kompozytowe izolatory wiszące do sieci prądu przemiennego o znamionowym napięciu powyżej 1000 V</i></p> <p><i>Definicje, metody badań i kryteria oceny</i></p> <p>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</p>
PN-EN 61284:2002	<p><i>Elektroenergetyczne linie napowietrzne. Wymagania i badania dotyczące osprzętu.</i></p> <p>Overhead lines – Requirements and tests for fittings</p>
PN-EN 61395E:2002	<p><i>Przewody energetyczne do linii napowietrznych – metoda badań płynięcia przewodów wielodrutowych</i></p> <p>Overhead electrical conductors – Creep test procedures for stranded conductors</p>
PN-EN ISO 1461:2011	<p><i>Powłoki cynkowe nanoszone na stal metodą zanurzeniową – Wymagania i metody badań</i></p> <p>Hot dip galvanized coatings on fabricated iron and steel articles – specifications and test methods</p>
PN-EN ISO 14688-1:2006	<p><i>Badania geotechniczne – Oznaczenie i klasyfikacja gruntów – Część 1: Oznaczenia i opis</i></p> <p>Geotechnical investigation and testing – Identification and classification of soil – Part 1: Identification and description</p>
PN-EN ISO 14688-2:2006	<p><i>Badania geotechniczne – Oznaczenia i klasyfikacja gruntów – Część 2 : Zasady klasyfikowania</i></p> <p>Geotechnical investigation and testing – Identification and classification of soil – Part 2: Principles for a classification</p>

PN-EN ISO 14713:2010	<i>Powłoki cynkowe – Wytyczne i zalecenia dotyczące ochrony przed korozją konstrukcji ze stopów żelaza – Część 1: Zasady ogólne dotyczące projektowania i odporności korozyjnej</i> Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel in structures – Part 1: General principles of design and corrosion resistance
PN-B-02482:1983	<i>Fundamenty budowlane – Nośność pali i fundamentów palowych</i> Building foundations – Bearing capacity of piles and pile foundations
PN-B-02483:1978	<i>Pale wielkośrednicowe wiercone – Wymagania i badania</i> Large diameter bored piles – Specifications and tests
PN-B-03322:1980	<i>Elektroenergetyczne linie napowietrzne – Fundamenty konstrukcji wsporczych – Obliczenia statyczne i projektowanie</i> Electric overhead lines – Foundations of supporting structures – Static calculations and design
PN-E-05115:2002	<i>Instalacje elektroenergetyczne prądu przemiennego o napięciu wyższym od 1 kV</i> Power installations exceeding 1 kV AC
PN-E-06303:1998	<i>Narażenie zabrudzeniowe izolacji napowietrznej i dobór izolatorów do warunków zabrudzeniowych</i> Exposure of outdoor insulation to pollution and selection of insulators under polluted conditions
PN-E-08051:1988	<i>Urządzenia elektryczne – Tablice i znaki bezpieczeństwa</i> Electrical equipment – Plates and safety signs

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(standards.itech.ai)

**National laws and regulations:**

<p><i>Obwieszczenie Ministra Środowiska, z dnia 15 października 2013 r. w sprawie ogłoszenia jednolitego tekstu rozporządzenia Ministra Środowiska w sprawie dopuszczalnych poziomów hałasu w środowisku (Dz.U. 2014, poz.112)</i> <a href="https://standards.itech.ai/catalog/standards/sist/1f74b112-7adc-4c43-85c3-3701-60da3c3181-50341-2-22-2016">SIST EN 50341-2-22:2016</a></p> <p>Announcement of the Minister for the Environment of 15 October 2013, regarding the publication of the uniform text of the Regulation of the Minister for the Environment regarding the maximum permissible noise levels for general environment (Journal of Laws of 2014, item 112)</p>
<p><i>Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 2 marca 1999r. w sprawie warunków technicznych, jakimi powinny odpowiadać drogi publiczne i ich usytuowanie (Dz.U. 1999 Nr 43, poz.430)</i></p> <p>Regulation of the Minister for Transport and Marine Economy of 2 March 1999, regarding the technical conditions that should be met by public roads and their location (Journal of Laws of 1999, No 43, item 430). (Journal of Laws of 1999, No: 43, item 430)</p>
<p><i>Rozporządzenie Ministra Infrastruktury z dnia 6 lutego 2003r. w sprawie bezpieczeństwa i higieny pracy podczas wykonywania robót budowlanych (Dz.U. 2003 Nr 47, poz.401)</i></p> <p>Regulation of the Minister of Infrastructure of 6 February 2003, regarding health and safety during execution of construction works (Journal of Laws of 6 February 2003, No. 47, item 401)</p>
<p><i>Rozporządzenie Ministra Środowiska z dnia 30 października 2003 r. w sprawie dopuszczalnych poziomów pól elektromagnetycznych w środowisku oraz sposobów sprawdzania dotrzymania tych poziomów (Dz.U.03.192.1883)</i></p> <p>Regulation of the Minister for the Environment of 30 October 2003, regarding the maximum permissible levels of electromagnetic fields in the general environment and methods of checking compliance with these levels (Journal of Laws of 2003, No. 192, item 1883)</p>
<p><i>Rozporządzenie Ministra Infrastruktury z dnia 28 kwietnia 2003 r. w sprawie przepisów żeglugowych na śródlądowych drogach wodnych (Dz.U.03.212.2072)</i></p> <p>Regulation of the Minister of Infrastructure of 28 April 2008 on navigation regulations on inland waterways (Journal of Laws of 2003, No. 212, item 2072)</p>
<p><i>Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 10 września 1998 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie (Dz.U.98.151.987)</i></p>

Regulation of the Minister for Transport and Infrastructure of 10 September 1998, regarding the technical condition for railway structures and their location (Journal of Laws of 1998, No. 151, item 987).
<i>Rozporządzenie Ministra Infrastruktury z dnia 25 czerwca 2003 r. w sprawie sposobu zgłaszania oznakowania przeszkód lotniczych (Dz.U.03.130.1193) oraz Rozporządzenie Ministra Transportu i Budownictwa z dnia 23 stycznia 2006 zmieniające rozporządzenie w sprawie sposobu zgłaszania oraz oznakowania przeszkód lotniczych (Dz.U.Nr 9, poz.53)</i>
Regulation of the Minister of Infrastructure of 25 June 2003 regarding the methods of markings air obstacles (Journal of Laws of 2003, No. 130, item 1193) and regulation of the Minister for Transport and Construction of 23 January 2006, amending the regulation of reporting and marking the air obstacles methods (Journal of Laws No. 9, item 53)
<i>Rozporządzenie Ministra Transportu, Budownictwa i Gospodarki Morskiej z 25 kwietnia 2012r w sprawie ustalania geotechnicznych warunków posadowienia obiektów budowlanych (DZ.U. z 2012 poz.463)</i>
Regulation of the Minister for Transport, Construction and Maritime Economy of 25 April 2012, regarding the determination of geotechnical conditions for founding buildings and structures (Journal of Laws of 2012, item 463)
<i>Ustawa z dnia 21 marca 1985 r. o drogach publicznych (tekst jednolity) (Dz.U.04.204.2086) oraz tekst ujednolicony z dnia 01.01.2014. (Dz.U. 2013 poz.260)</i>
Act of 21 March 1985 on public roads (uniform text) (Journal of Laws of 2004, No. 204, item 2086) and uniformed text of 1 January 2014 (Journal of Laws of 2013, item 260)
<i>Ustawa z dnia 18 lipca 2001 r. Prawo Wodne (Dz.U. Nr 115, poz. 1229) oraz Ustawa z dnia 4.01.2013 o zmianie ustawy-Prawo wodne oraz niektórych innych ustaw (Dz.U.2013 poz.165)</i>
Act of 18 July 2001 Water Law (Journal of Laws No. 115, item 1229) and Act of 4 January 2013 on the amendment of the Water Law (Journal of Laws of 2013, item 165)
<i>Rozporządzenie Ministra Infrastruktury z dnia 26 października 2005r. w sprawie warunków technicznych, jakim powinny odpowiadać telekomunikacyjne obiekty budowlane i ich usytuowanie (Dz.U. 2005 Nr 219, poz.1864)</i>
Regulation of the Minister for the Infrastructure of 26 October 2005 on technical conditions applicable to telecommunication structures and their location (Journal of Laws of 2005, No. 219, item 1864)
<i>Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie (Dz.U. 2002 Nr 75, poz. 690)</i>
Regulation of the Minister for the Infrastructure of 12 April 2002 on technical conditions applicable to buildings and their locations (Journal of Laws of 2002, No. 75, item 690)
<i>Rozporządzenie Rady Ministrów z dnia 7 maja 2002 w sprawie klasyfikacji śródlądowych dróg wodnych (Dz. U. 47 poz.401)</i>
Regulation of the Council of Ministers of 7 May 2002, on the classification of internal waterways (Journal of Laws No. 47, item 401)
<i>Rozporządzenie Ministra Gospodarki z dnia 26 kwietnia 2013 w sprawie warunków technicznych jakim powinny odpowiadać sieci gazowe i ich usytuowanie (Dz.U 2013 poz.640)</i>
Regulation of the Minister for the Economy of 26 April 2013 on technical conditions applicable to gas pipelines and their locations (Journal of Laws of 2013, item 640)

## 2.2 Definitions – in alphabetical order in Polish language

This NNA features a list of definitions contained in Part 1 of the Standard – in alphabetical order in Polish language; however after translating into English, the alphabetical order of definitions could not be retained.

No.	Definition	Item number in PN-EN 50341-1
1	Safety	2.2. 79
2	Earth fault	2.2. 27
3	Effect of action	2.2. 37
4	Element	2.2. 39

5	Purpose	2.2.	68
6	Magnetic flux density	2.2.	57
7	Exclusion limit probability of a variable	2.2.	41
8	Impedance to earth of an earthing system	2.2.	51
9	Composite insulator	2.2.	15
10	Combination of actions	2.2.	11
11	Structure	2.2.	87
12	Support (tower)	2.2.	88
13	Temporary line	2.2.	102
14	Highest permissible expected touch voltage	2.2.	109
15	Highest system voltage	2.2.	49
16	Effective touch voltage	2.2.	103
17	Touch voltage	2.2.	85
18	Earth potential rise	2.2.	29
19	Nominal system voltage	2.2.	59
20	Unavailability	2.2.	106
21	Reliability (electrical)	2.2.	74
22	Reliability (structural)	2.2.	75
23	Resistance (structural)	2.2.	76
24	Characteristic resistance	2.2.	6
25	Design resistance	2.2.	19
26	Design working life	2.2.	23
27	Frequently attended area by people	2.2.	47
28	Action	2.2.	1
29	Dynamic action	2.2.	24
30	Quasi – static action	2.2.	69
31	Permanent action	2.2.	64
32	Static action	2.2.	84
33	Free action	2.2.	46
34	Fixed action	2.2.	44
35	Accidental action	2.2.	2
36	Variable action	2.2.	108
37	Clearance	2.2.	9
38	Internal clearance	2.2.	52
39	External clearance	2.2.	42
40	Reference period	2.2.	73
41	Return period	2.2.	78
42	Security	2.2.	80