

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-IS-12072-01-00 according to DIN EN ISO/IEC 17020:2012

Valid from: 23.08.2023

Date of issue: 19.01.2024

Holder of accreditation certificate:

**PEHLA GmbH- Gesellschaft für elektrische Hochleistungsprüfungen
Beckstraße 15, 69469 Weinheim**

with the location

**PEHLA GmbH- Gesellschaft für elektrische Hochleistungsprüfungen
PEHLA Inspektion & Services
Beckstraße 15, 69469 Weinheim**

The inspection body type A meets the requirements of DIN EN ISO/IEC 17020:2012 to carry out the conformity assessment activities listed in this annex. The inspection body meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17020 are written in the language relevant to the operations of inspection bodies and they conform to the principles of DIN EN ISO 9001.

Products, Electrical energy technology devices and systems as well as cables and lines for alternating and direct voltage above 1kV and determination of their compliance - based on an expert assessment with general requirements.

Inspectionssystem: IP 115 2023-07 Rev.05

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de>.

Abbreviations used: see last page

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This document is a translation. The definitive version is the original German annex to the accreditation certificate.

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Inspection body type:	A
Inspection category:	Products
Inspection field:	Electrical Engineering Environmental simulation tests
Range of inspection:	Products, devices and systems from the field of electrical power engineering for alternating and direct voltage over 1 kV, including cables and wires.
Stage of the product:	Design Prototype Factory-ready Commissioning In service Failure / Damaged
Inspection programs:	B: Inspection of tests. C: Inspection of damage assessments and failure analyses. D: Inspection of the identity of products in relation to the available test documents and design evidence. E: Inspection of the product data specified by the manufacturer. Verification for transferability of proof of conformity to variants of the inspected devices and systems.
Inspection requirements:	Inspections are carried out for inspection fields, range of inspection and stage of the product according to the standards listed in the following tables.

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Inspection for (DIN EN ISO/IEC 17020):

Standard, Year of issue	Title of the Standard	Inspection item
IEC 62271-1:2017 +AMD1:2021	High-voltage switchgear and controlgear Part 1: Common specifications for high-voltage switchgear and controlgear standards	Switchgear & Controlgear
IEC 62271-100:2021	High-voltage switchgear and controlgear Part 100: Alternating-current circuit-breakers	Circuit-breaker Disconnecter Earthing switch Load-break switch
IEC 62271-101:2021	High-voltage switchgear and controlgear Part 101: Synthetic testing	
IEC 62271-102:2022	High-voltage switchgear and controlgear Part 102: Alternating current disconnectors and earthing switches	
IEC 62271-103:2021	High-voltage switchgear and controlgear Part 103: Alternating current switches for rated voltages above 1 kV up to and including 52 kV	
IEC 62271-104:2020	High-voltage switchgear and controlgear Part 104: Alternating current switches for rated voltages higher than 52 kV	
IEC 62271-105:2021	High-voltage switchgear and controlgear Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV	
IEC 62271-107:2019	High-voltage switchgear and controlgear Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV	
IEC 62271-108:2020	High-voltage switchgear and controlgear Part 108: High-voltage alternating current disconnecting circuit-breakers for rated voltages above 52 kV	
IEC 62271-109:2019	High-voltage switchgear and controlgear Part 109: Alternating-current series capacitor by-pass switches	
IEC 62271-110:2023	High-voltage switchgear and controlgear Part 110: Inductive load switching	
IEC 62271-111:2019	High-voltage switchgear and controlgear Part 111: Automatic circuit reclosers for alternating current systems up to and including 38 kV	
IEC 62271-112:2021	High-voltage switchgear and controlgear Part 112: Alternating current high-speed earthing switches for secondary arc extinction on transmission lines	

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IEEE C37.04-2018 /Cor 1-2021	IEEE Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V	Circuit-breaker Disconnecter Earthing switch Load-break switch
IEEE C37.09-2018 /Cor 1-2021	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V	
IEC 62271-106:2021	High-voltage switchgear and controlgear Part 106: Alternating current contactors, contactor-based controllers and motor-starters	Contactors Motor-starters
IEC 62271-200:2021	High-voltage switchgear and controlgear Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	Switchgear & Controlgear
IEC 62271-201:2014	High-voltage switchgear and controlgear Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	
IEC 62271-202:2022	High-voltage switchgear and controlgear Part 202: High-voltage/low voltage prefabricated substation	
IEC 62271-203:2022	High-voltage switchgear and controlgear Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	
IEC 62271-204:2022	High-voltage switchgear and controlgear Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV	
IEC 62271-205:2008	High-voltage switchgear and controlgear Part 205: Compact switchgear assemblies for rated voltages above 52 kV	
IEC 62271-207:2012 /COR1:2013	High-voltage switchgear and controlgear Part 207: Seismic qualification for gas-insulated switchgear assemblies for rated voltages above 52 kV	
IEC 62271-209:2022	High-voltage switchgear and controlgear Part 209: Cable connections for gas-insulated metal-enclosed switchgear for rated voltages above 52 kV - Fluid-filled and extruded insulation cables - Fluid-filled and dry-type cable-terminations	
IEC TS 62271-210:2013	High-voltage switchgear and controlgear Part 210: Seismic qualification for metal enclosed and solid-insulation enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV	

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IEC 60077-5:2019	Railway applications - Electric equipment for rolling stock Part 5: Electrotechnical components - Rules for HV fuses	Fuses
IEC 60282-1:2020	High voltage fuses Part 1: Current-limiting fuses	
IEC 60282-2:2008	High voltage fuses Part 2: Expulsion fuses	
IEC 60644:2009 +AMD1:2019	Specification for high-voltage fuse-links for motor circuit applications	
IEC 60099-4:2014	Surge arresters Part 4: Metal-oxide surge arresters without gaps for a.c. systems	Surge arresters
IEC 60099-5:2018	Surge arresters Part 5: Selection and application recommendations	
IEC 60099-6:2019	Surge arresters Part 6: Surge arresters containing both series and parallel gapped structures - System voltage of 52 kV and less	
IEC 60099-8:2017	Surge arresters Part 8: Metal-oxide surge arresters with external series gap (EGLA) for overhead transmission and distribution lines of a.c. systems above 1 kV	
IEC 60099-9:2014	Surge arresters Part 9: Metal-oxide surge arresters without gaps for HVDC converter stations	
IEC 60076-1:2011	Power transformers Part 1: General	Transformers Tap-Changers Reactors
IEC 60076-2:2011	Power transformers Part 2: Temperature rise for liquid-immersed transformers	
IEC 60076-3:2013 +AMD1:2018	Power transformers Part 3: Insulation levels, dielectric tests and external clearances in air	
IEC 60076-4:2002	Power transformers Part 4: Guide to the lightning impulse and switching impulse testing - Power transformers and reactors	
IEC 60076-5:2006	Power transformers Part 5: Ability to withstand short-circuit	
IEC 60076-6:2007	Power transformers Part 6: Reactors	

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IEC 60076-7:2018	Power transformers Part 7: Loading guide for oil-immersed power transformers	
IEC 60076-10:2016 +AMD1:2020	Power Transformers Part 10: Determination of sound levels	
IEC 60076-11:2018	Power transformers Part 11: Dry-type transformers	
IEC 60076-13:2006	Power transformers Part 13: Self-protected liquid-filled transformers	
IEC 60076-14:2013	Power transformers Part 14: Liquid-immersed power transformers using high-temperature insulation materials	
IEC 60076-15:2015	Power transformers Part 15: Gas-filled power transformers	
IEC/IEEE 60076-16:2018	Power transformers Part 16: Transformers for wind turbine applications	
IEC 60076-18:2012	Power transformers Part 18: Measurement of frequency response	
IEC/IEEE 60076-57-129:2017	Power transformers Part 57-129: Transformers for HVDC applications	
IEC 60214-1:2014	Tap-changers Part 1: Performance requirements and test methods	
IEC 61378-1:2011	Convertor transformers Part 1: Transformers for industrial applications	
IEEE C57.12.00-2021	IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers	Transformers Tap-Changers Reactors
IEEE C57.12.01-2020	IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers	
IEC 61869-1:2023	Instrument transformers Part 1: General requirements	Instrument transformers
IEC 61869-2:2012	Instrument transformers Part 2: Additional requirements for current transformers	
IEC 61869-3:2011	Instrument transformers Part 3: Additional requirements for inductive voltage transformers	

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IEC 61869-4:2013	Instrument transformers Part 4: Additional requirements for combined transformers	
IEC 61869-5:2011	Instrument transformers Part 5: Additional requirements for capacitor voltage transformers	
IEC 61869-6:2016	Instrument transformers Part 6: Additional general requirements for low-power instrument transformers	
IEC 61869-10:2017	Instrument transformers Part 10: Additional requirements for low-power passive current transformers	
IEC 61869-11:2017	Instrument transformers Part 11: Additional requirements for low power passive voltage transformers	
IEC 60044-7:1999	Instrument transformers Part 7: Electronic voltage transformers	
IEC 60044-8:2002	Instrument transformers Part 8: Electronic current transformers	
IEEE C57.13:2016	Requirements for instrument transformers	
IEC 60252-1:2010 +AMD1:2013	AC motor capacitors Part 1: General - Performance, testing and rating - Safety requirements - Guidance for installation and operation	Capacitors
IEC 60252-2:2010 +AMD1:2013	AC motor capacitors Part 2: Motor start capacitors	
IEC 60110-1:1998	Power capacitors for induction heating installations Part 1: General	
IEC 60143-1:2015	Series capacitors for power systems Part 1: General	
IEC 60143-2:2012 +AMD1:2021	Series capacitors for power systems Part 2: Protective equipment for series capacitor banks	
IEC 60143-4:2010	Series capacitors for power systems Part 4: Thyristor controlled series capacitors	
IEC 63210:2021	Shunt power capacitors of the self-healing type for AC systems having a rated voltage above 1 000 V	

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IEC 60871-1:2014	Shunt capacitors for a.c. power systems having a rated voltage above 1000 V Part 1: General	
IEC TS 60871-2:2014 +AMD1:2022	Shunt capacitors for a.c. power systems having a rated voltage above 1000 V Part 2: Endurance testing	
IEEE 824: 1985	IEEE Standard for Series Capacitors in Power Systems	
IEC 60137:2017	Insulated bushings for alternating voltages above 1000 V	Insulators Bushings
IEC 60168:1994 +AMD1:1997 +AMD2:2000 CSV	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V	
IEC 60273:1990	Characteristic of indoor and outdoor post insulators for systems with nominal voltages greater than 1000 V	
IEC 60305:2021	Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic or glass insulator units for AC systems - Characteristics of insulator units of the cap and pin type	
IEC 60383-1:1993	Insulators for overhead lines with a nominal voltage above 1000 V Part 1: Ceramic or glass insulator units for a.c. systems - Definitions, test methods and acceptance criteria	
IEC 60383-2:1993	Insulators for overhead lines with a nominal voltage above 1000 V Part 2: Insulator strings and insulator sets for a.c. systems - Definitions, test methods and acceptance criteria	
IEC 60433:2021	Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic insulators for AC systems - Characteristics of insulator units of the long rod type	
IEC 60507:2013	Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems	
IEC TS 60815-1:2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions Part 1: Definitions, information and general principles	
IEC TS 60815-2:2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions Part 2: Ceramic and glass insulators for a.c. systems	

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IEC TS 60815-3:2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions Part 3: Polymer insulators for a.c. systems	
IEC TS 60815-4:2016	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions Part 4: Insulators for d.c. systems	Insulators Bushings
IEC 61109:2008	Insulators for overhead lines - Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria	
IEC TS 61245:2015	Artificial pollution tests on high-voltage ceramic and glass insulators to be used on d.c. systems	
IEC 61325:1995	Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic or glass insulator units for d.c. systems - Definitions, test methods and acceptance criteria	
IEC TS 61245:2015	Artificial pollution tests on high-voltage ceramic and glass insulators to be used on d.c. systems	
IEC 62217:2012	Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria	
IEC 62231:2006	Composite station post insulators for substations with a.c. voltages greater than 1 000 V up to 245 kV - Definitions, test methods and acceptance criteria	
IEC 62772:2023	Composite hollow core station post insulators with AC voltage greater than 1 000 V and DC voltage greater than 1 500 V - Definitions, test methods and acceptance criteria	
IEC TS 62896:2015	Hybrid insulators for a.c. and d.c. for high-voltage applications - Definitions, test methods and acceptance criteria	
IEC/IEEE 65700-19-03:2014	Bushings for DC application	
IEC 61284:1997	Overhead lines - Requirements and tests for fittings	Overhead lines - fittings
IEC 60146-1-1:2009	Semiconductor convertors; general requirements and line commutated convertors Part 1-1: specifications of basic requirements	Thyristor valves Semiconductor

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IEC 60146-2:1999	Semiconductor converters Part 2: Self-commutated semiconductor converters including direct d.c. converters	converters Line-commutated converters
IEC 60700-1:2015 +AMD1:2021	Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing	
IEC TR 60919-1:2020	Performance of high-voltage direct current (HVDC) systems with line-commutated converters - Part 1: Steady-state conditions	
IEC TR 60919-2:2008 +AMD1:2015 +AMD2:2020	Performance of high-voltage direct current (HVDC) systems with line-commutated converters - Part 2: Faults and switching	
IEC 62823:2015 +AMD1:2019	Thyristor valves for thyristor-controlled series capacitors (TCSC) - Electrical testing	
IEC TS 63014-1:2018	High voltage direct current (HVDC) power transmission - System requirements for DC-side equipment - Part 1: Using line-commutated converter	
IEC 60055-1 :1997 /AMD1:2005	Paper-insulated metal-sheathed cables for rated voltages up to 18/30 kV (with copper or aluminium conductors and excluding gas-pressure and oil-filled cables) Part 1: Tests on cables and their accessories	Cables, Cable clamps Cable sheaths
IEC 60229:2007	Electric cables - Tests on extruded oversheaths with a special protective function	
IEC 60502-1:2021	Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV)	
IEC 60502-2:2014	Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) Part 2: Cables for rated voltages from 6 kV ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ kV)	
IEC 60502-4:2023	Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) Part 4: Test requirements on accessories for cables with rated voltages from 6 kV ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ kV)	

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IEC 60793-1-1:2022	Optical fibres Part 1-1: Measurement methods and test procedures - General and guidance	
IEC 60794-1-1:2023	Optical fibre cables Part 1-1: Generic specification - General	
IEC 60811-100:2012	Electric and optical fibre cables - Test methods for non- metallic materials Part 100: General	
IEC 60840:2020 +AMD1:2023	Power cables with extruded insulation and their accessories for rated voltages above 30 kV (Um= 36 kV) up to 150 kV (Um = 170 kV) - Test methods and requirements	
IEC 61442:2005	Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
IEC 61443:1999 +AMD1:2008	Short-circuit temperature limits of electric cables with rated voltages above 30 kV (Um = 36 kV)	Cables, Cable clamps Cable sheaths
IEC 60949:1988	Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects	
IEC 61238-1-1:2018	Compression and mechanical connectors for power cables Part 1-1: Test methods and requirements for compression and mechanical connectors for power cables for rated voltages up to 1 kV (Um = 1,2 kV) tested on non-insulated conductors	
IEC 61238-1-2:2018	Compression and mechanical connectors for power cables Part 1-2: Test methods and requirements for insulation piercing connectors for power cables for rated voltages up to 1 kV (Um = 1,2 kV) tested on insulated conductors	
IEC 61238-1-3:2018	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 (Um = 1,2 kV) up to 30 kV (Um = 36 kV) tested on non-insulated conductors	

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IEC 61442:2005	Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
IEC 61443:1999 +AMD1:2008	Short-circuit temperature limits of electric cables with rated voltages above 30 kV (Um = 36 kV)	
IEC TR 61901:2016	Tests recommended on cables with a longitudinally applied metal foil for rated voltages above 30 kV (Um = 36 kV) up to and including 500 kV (Um = 550 kV)	
IEC 61914:2021 CMV	Cable cleats for electrical installations	
IEC 62067:2022	Power cables with extruded insulation and their accessories for rated voltages above 150 kV (Um = 170 kV) up to 500 kV (Um = 550 kV) - Test methods and requirements	
IEC 62895:2017	High voltage direct current (HVDC) power transmission - Cables with extruded insulation and their accessories for rated voltages up to 320 kV for land applications - Test methods and requirements	
ISO 9227:2017	Corrosion tests in artificial atmospheres — Salt spray tests	
IEC 60068-2-1:2007	Environmental testing Part 2-1: Tests - Test A: Cold	
IEC 60068-2-2:2007	Environmental testing Part 2-2: Tests - Test B: Dry heat	
IEC 60068-2-6:2007	Environmental testing Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	
IEC 60068-2-11:2021	Environmental testing Part 2-11: Tests - Test Ka: Salt mist	
IEC 60068-2-14:2009	Environmental testing Part 2-14: Tests - Test N: Change of temperature	
IEC 60068-2-17:1994	Basic environmental testing procedures Part 2-17: Tests - Test Q: Sealing	
IEC 60068-2-27:2008	Environmental testing Part 2-27: Tests - Test Ea and guidance: Shock	
IEC 60068-2-30:2005	Environmental testing Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	

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IEC 60068-2-38:2021	Environmental testing Part 2-38: Tests - Test Z/AD: Composite temperature /humidity cyclic test	
IEC 60068-2-52:2017	Environmental testing Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	
IEC 60068-2-57:2013	Environmental testing Part 2-57: Tests - Test Ff: Vibration - Time-history and sine-beat method	
IEC 60068-2-64:2008 +AMD1:2019	Environmental testing Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance	
IEC 60068-2-78:2012	Environmental testing Part 2-78: Tests - Test Cab: Damp heat, steady state	
IEC 60529:1989 +AMD1:1999 +AMD2:2013	Degrees of protection provided by enclosures (IP Code)	
IEC 62262:2002 +AMD1:2021	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	Miscellaneous
IEC 60422:2013	Mineral insulating oils in electrical equipment - Supervision and maintenance guidance	
IEC 60567:2011	Oil-filled electrical equipment - Sampling of gases and analysis of free and dissolved gases - Guidance	
IEC 60599:2022	Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis	