

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-19102-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **22.09.2020**

Date of issue: 28.09.2020

Holder of certificate:

AUCOTEAM GmbH
Storkower Straße 115 a, 10407 Berlin

for its

Test laboratory for climatic, mechanical und corrosive environmental stress
Storkower Straße 115 a, 10407 Berlin

Tests in the fields:

environmental simulation tests in the fields of temperature, humidity, corrosion, vibration and mechanical shock, solar simulation as well as tests in their combinations of technical products; protection tests; glow-wire test

The laboratory is permitted within the specified testing fields *, without being required to inform and obtain prior approval from DAkKS the free choice of standard or equivalent test methods. The listed test methods are exemplary. The laboratory maintains a current list of all test methods in a flexible scope of accreditation.

The management system requirements in DIN EN ISO/IEC 17025 are written in language relevant to operations of testing laboratories and operate generally in accordance with the principles of DIN EN ISO 9001.

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

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1 Tests in the field of climatic, corrosive and mechanic-dynamical environmental testing

1.1 Testing field climatic tests *

Inspection type:	
Testing of environmental resistance in terms of temperature, relative humidity, temperature changes, pressure changes with and without temperature as well as artificial weathering	
Matrix / Sample / Test item / Test object:	
Electrotechnical, mechanical as well as mechatronic products and devices, casings, components, packages, materials and coatings	
Measured quantities:	
Temperature, relative humidity, pressure, UV irradiance	
Typical standards:	
DIN EN 50155 2018-05	Railway applications - Rolling stock - Electronic equipment (Restriction: <i>no EMC tests</i>)
DIN EN 60068-2-1 2008-01	Environmental testing - Part 2-1: Tests - Test A: Cold
DIN EN 60068-2-2 2008-05	Environmental testing - Part 2-2: Tests - Test B: Dry heat
DIN EN 60068-2-13 2000-02	Environmental testing - Part 2: Tests; test M: Low air pressure
DIN EN 60068-2-14 2010-04	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
DIN EN 60068-2-30 2006-06	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
DIN EN 60068-2-38 2010-06	Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test
DIN EN 60068-2-40 2000-08	Environmental testing - Part 2: Tests; test Z/AM: Combined cold/low air pressure tests
DIN EN 60068-2-41 2000-08	Environmental testing - Part 2: Tests; test Z/BM: Combined dry heat/low air pressure tests
DIN EN 60068-2-66 1995-06	Environmental testing - Part 2: Test methods - Test Cx: Damp heat, steady state (unsaturated pressurized vapour)
DIN EN 60068-2-67 1996-07	Environmental testing - Part 2-67: Tests - Test Cy: Damp heat, steady state, accelerated test primarily intended for components
DIN EN 60068-2-78 2014-02	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state

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Inspection type: Testing of environmental resistance in terms of temperature, relative humidity, temperature changes, pressure changes with and without temperature as well as artificial weathering	
Matrix / Sample / Test item / Test object: Electrotechnical, mechanical as well as mechatronic products and devices, casings, components, packages, materials and coatings	
Measured quantities: Temperature, relative humidity, pressure, UV irradiance	
DIN EN ISO 4892-3 2016-10	Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (Restriction: <i>Cycle numbers 3 and 5 only</i>)
DIN EN ISO 6270-2 2018-04	Paints and varnishes - Determination of resistance to humidity - Part 2: Condensation (in-cabinet exposure with heated water reservoir)

1.2 Testing field mechanical-dynamical tests *

Inspection type: Testing of resistance against environmental influences by vibrations, shock loads, impacts and free fall with and without climatic superposition	
Matrix / Sample / Test item / Test object: Electrotechnical, mechanical as well as mechatronic products and devices, casings, components, packages, materials and coatings	
Measured quantities: Frequency, acceleration, impact energy, fall height, temperature, relative humidity	
Typical standards:	
DIN EN 60068-2-6 2008-10	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
DIN EN 60068-2-27 2010-02	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
DIN EN 60068-2-31 2009-04	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens
DIN EN 60068-2-53 2011-02	Environmental testing - Part 2-53: Tests and guidance: Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests
DIN EN 60068-2-55 2014-10	Environmental testing - Part 2-55: Tests - Test Ee and guidance - Loose cargo testing including bounce
DIN EN 60068-2-64 2009-04	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64:2008)

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Inspection type: Testing of resistance against environmental influences by vibrations, shock loads, impacts and free fall with and without climatic superposition	
Matrix / Sample / Test item / Test object: Electrotechnical, mechanical as well as mechatronic products and devices, casings, components, packages, materials and coatings	
Measured quantities: Frequency, acceleration, impact energy, fall height, temperature, relative humidity	
DIN EN 60068-2-75 2015-08	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests
DIN EN 60068-2-77 1999-10	Environmental testing - Part 2-77: Tests; test 77: Body strength and impact shock
DIN EN 60068-2-80 2006-05	Environmental testing - Part 2-80: Tests - Test Fi: Vibration - Mixed mode
DIN EN 61373 2011-04	Railway applications - Rolling stock equipment - Shock and vibration tests

1.3 Testing field corrosive tests *

Inspection type: Testing of corrosion resistance by constant and cyclic salt spray tests	
Matrix / Sample / Test item / Test object: Electrotechnical, mechanical as well as mechatronic products and devices, casings, components, packages, materials and coatings	
Measured quantities: Salt concentration, temperature, relative humidity, precipitation	
Typical standards:	
DIN EN 50155 2019-10	Railway applications - Rolling stock - Electronic equipment
DIN EN 60068-2-11 2000-02	Environmental testing - Part 2: Tests; test Ka: Salt mist
DIN EN IEC 60068-2-52 2018-08	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)
DIN EN ISO 9227 2017-07	Corrosion tests in artificial atmospheres - Salt spray tests (Restriction: <i>neutral salt spray test (NSS-test) only</i>)

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1.4 Tests according to standards

ASTM B 117 2019	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM D 999-08 2015	Standard Test Methods for Vibration Testing of Shipping Containers (Restriction: <i>method A1 (Vertical Motion) only</i>)
ASTM D 4169-16 2016	Standard Practice for Performance Testing of Shipping Containers and Systems
ASTM D 4728 2017	Standard Test Methods for Random Vibration Testing of Shipping Containers
DIN EN 50102 1997-09	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) (Restriction: <i>IK06 to IK10 only</i>)
DIN EN 50470-1 2019-08	Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
DIN EN 60068-2-61 1993-12	Environmental testing - Part 2: Test methods - Test Z/ABDM: Climatic sequence
DIN EN 60068-2-68 1997-02	Environmental testing - Part 2: Tests - Test L: Dust and sand
DIN EN 60255-21-1 1996-05	Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 1: Vibration tests (sinusoidal)
DIN EN 60255-21-2 1996-05	Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 2: Shock and bump tests
DIN EN 60255-21-3 1995-11	Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 3: Seismic tests
DIN EN 60255-27 VDE 0435-327 2019-02	Measuring relays and protection equipment - Part 27: Product safety requirements (Restriction: <i>the following test methods only:</i> - 9 <i>Inscriptions, documentation and packaging</i> - 10.5.1 <i>Climatic environmental tests</i> - 10.5.2 <i>Mechanical tests</i>)

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<p>DIN EN 60601-1-11 VDE 0750-1-11 2016-04</p>	<p>Medical electrical equipment - Part 1-11: General requirements for basic safety and essential performance - Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment (Restriction: <i>the following test methods only:</i> - 4.2 <i>Environmental conditions</i> - 5 <i>General requirements for the testing of ME devices</i> - 10.1 <i>Additional requirements for mechanical strength</i>)</p>
<p>DIN EN 60695-2-11 VDE 0471-2-11 2014-11</p>	<p>Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)</p>
<p>DIN EN 60695-2-12 VDE 0471-2-12 2015-01</p>	<p>Fire hazard testing - Part 2-12: Glowing/hot-wire based test methods - Glow-wire flammability index (GWFI) test method for materials</p>
<p>DIN EN 60695-2-13 VDE 0471-2-13 2015-01</p>	<p>Fire hazard testing - Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignition temperature (GWIT) test method for materials</p>
<p>DIN EN 60945 2003-07</p>	<p>Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results (Restriction: <i>the following test methods only:</i> - 8.2 <i>Dry heat</i> - 8.3 <i>Damp heat</i> - 8.4 <i>Cold</i> - 8.5 <i>Heat shock (portable devices)</i> - 8.6.1 <i>Case on a solid surface</i> - 8.7 <i>Vibration (all device classes)</i> - 8.8 <i>Rain and spray (suspended devices)</i> - 8.11 <i>Resistance to oil (portable devices)</i> - 8.12 <i>Corrosion (Salt spray) (all device classes)</i> - 12.1 <i>Protection against accidental contact with hazardous voltages</i>)</p>

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DIN EN 61010-1 2011-07	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Restriction: <i>the following test methods only:</i> - 5 <i>Marking and documentation</i> - 8 <i>Resistance to mechanical stresses</i> - 10 <i>Equipment temperature limits and resistance to heat</i> <u>except:</u> <i>10.5.1 Maintenance to air and creepage distances</i> <i>10.5.3 Insulation materials</i>)
DIN EN 62052-11 VDE 0418-2-11 2017-09	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment (Restriction: <i>all test methods, <u>except:</u></i> - 7.4 <i>Test for ground fault</i> - 7.5 <i>Electromagnetic compatibility</i>)
DIN EN 62271-203 VDE 0671-203 2012-11	High-voltage switchgear and controlgear - Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV (here: <i>point 6.106.1</i>)
DIN EN ISO 2360 2017-12	Non-conductive coatings on non-magnetic electrically conductive base metals - Measurement of coating thickness - Amplitude-sensitive eddy-current method
DIN EN ISO 2409 2013-06	Paints and varnishes - Cross-cut test
DIN EN ISO 2808 2019-12	Paints and varnishes - Determination of film thickness (Restriction: <i>determination of the dry film thickness only:</i> <i>Method 7C, Method 7D</i>)
DIN EN ISO 4624 2016-08	Paints and varnishes - Pull-off test for adhesion
DIN EN ISO 4628-2 2016-07	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 2: Assessment of degree of blistering
DIN EN ISO 4628-3 2016-07	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting
DIN EN ISO 4628-4 2016-07	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 4: Assessment of degree of cracking

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DIN EN ISO 4628-5 2016-07	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 5: Assessment of degree of flaking
DIN EN ISO 4628-6 2011-12	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 6: Assessment of degree of chalking by tape method
DIN EN ISO 4628-8 2013-03	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect
DIN EN ISO 16474-3 2014-03	Paints and varnishes - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (Restriction: <i>Cycle number 2 and 3 only</i>)
ISO 16750-3 2012-12	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 3: Mechanical loads (Restriction: <i>Point 4.5 Gravel Bombardement only</i>)
ISO 16750-4 2010-04	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 4: Climatic loads (Restriction: <i>Point 5.9 Solar Radiation only</i>)
ISO 16750-5 2010-04	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 5: Chemical loads
MIL STD 810G w/Change 1 2014-04	Environmental engineering considerations and laboratory tests (Restriction: <i>the following test methods only:</i> <ul style="list-style-type: none"> - 500.6 Vacuum - 501.6 High temperature - 502.6 Low temperature - 503.6 Temperature changes, fast - 504.2 Contamination by fluids - 506.6 Rain - 507.6 Air moisture - 509.6 Salt spray - 510.6 Dust - 512.6 Dipping - 514.7 Swing

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MIL STD 810G w/Change 1 2014-04	- 516.7 - 520.4 - 523.4 - 528.1	<i>Shock</i> <i>Temperature, air moisture, swing and altitude</i> <i>Vibro-acoustics / temperature</i> <i>Mechanical vibration of ship equipment)</i>
MIL-STD 883K w/Change 3 2018-05	Test method standard microcircuits (Restriction: <i>the following test methods only:</i> - 1001 - 1003 - 1004.7 - 1009.8 - 1010.8 - 1011.9 - 2001.3 - 2005.2 - 2006.1 - 2007.3 - 2026	<i>Barometric pressure reduced (altitude operation)</i> <i>High voltage, insulation resistance</i> <i>Maisture resistance</i> <i>Salt atmosphere</i> <i>Temperature changes, slowly</i> <i>Temperature changes, fast</i> <i>Constant acceleration</i> <i>Swing</i> <i>Swing</i> <i>Swing</i> <i>Swing)</i>

1.5 Tests according to further test procedures

DNVGL-CG-0339 2019-12	Environmental test specification for electrical, electronic and programmable equipment and systems
ISTA 2A 2011-01	Partial-Simulation Performance Test Procedure - Packaged-Products 150 lb (68 kg) or less
JDQ 53.3 2014-04	Environmental Design & Testing of Electronic/Electrical Components an Assemblies (Restriction: <i>the following test methods only:</i> - Point 3 <i>Dust (except 3.3 Particle Impact)</i> - Point 4 <i>Fluids</i> - Point 6 <i>Mechanical (except 6.3.2 Transit Shock)</i> - Point 7 <i>Temperature / Humidity)</i>
JDQ 201 2015-03	Testing of Electronic and Electrical Devices - Environmental and Mechanical Loads (Restriction: <i>all test methods, except:</i> - Point 7 <i>JDQ 201A3 - Particle Impact</i> - Point 13 <i>JDQ 201C1 - Corrosive Atmosphere</i> - Point 18 <i>JDQ 201D5 - Vibration Calibrated Accelerated Life Test (CALT)</i> - Point 21 <i>JDQ 201E3 - Transit Shock)</i>

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Lloyds Register of Shipping 2015-07	Guidelines on the implementation of Type Tests, LR Type Approval System - Test Specification Number 1 (here: <i>Point 1-14</i>)
MAN M3499-1 2017-01	General requirements for electrical, electronic, mechatronic and mechanical systems (Restriction: <i>the following test methods only:</i> - <i>Point 6.9 Noxious gas test</i> - <i>Point 6.13 Dirt spray chamber test</i> - <i>Point 6.15 Flammability test</i> - <i>Point 6.16 Light fastness test by xenon (UV resistance)</i> - <i>Point 7.6 Gravel bombardment and impact</i> - <i>Point 8.2 EMC</i>)
MBN 10 305-1 2008-06	E/E Environmental Testing - Part 1: Test Specifications (Restriction: <i>the following test methods only:</i> - <i>Pkt. 5 Environmental Testing</i> - <i>Pkt. 6 Environmental Test Specification (except: 6.1.9 Solar Radiation Soak 6.4.1 Mixed Flowing Gas)</i>)
MBN 10 305-2 2008-06	E/E Environmental Testing - Part 2: Test Selection Process
MBN LV 124-1 2013-03	Electrical and electronic components in assenger vehicles up to 3,5 tonnes - General requirements, test conditions and test methods - Part 1: Electrical requirements
MBN LV 124-2 2013-08	Electrical and electronic components in assenger vehicles up to 3,5 tonnes - General requirements, test conditions and test methods - Part 2: Environmental requirements (Restriction: <i>all test methods, except:</i> - <i>Point 13.2 Gravel bombardment and impact</i> - <i>Point 14.18 Noxious gas test</i>)
RTCA / DO-160G 2010-12	Environmental conditions and test procedures for airborne equipment (Restriction: <i>the following test methods only:</i> - <i>Sec 4 Cold, dry heat, temperature changes, low-pressure</i> - <i>Sec 5 Temperature changes</i> - <i>Sec 6 Damp heat</i> - <i>Sec 7 Shock, constant acceleration</i> - <i>Sec 8 Swing</i> - <i>Sec 10 Condensation, splash</i> - <i>Sec 12.4 dust</i> - <i>Sec 14 Salt spray</i>)

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VW 80000 Electrical and electronic components in motor vehicles up to 3,5 tonnes -
2017-10 General requirements, test conditions and test
 (Restriction: *all test methods, **except:***
 - *Point. 10.2 Gravel bombardment and impact*
 - *Point 11.18 Noxious gas test*)

2 Protection tests and safety inspections

DIN EN 60529 Degrees of protection provided by enclosures (IP Code)
VDE 0470-1
2014-09

ISO 20653 Road vehicles - Degrees of protection (IP code) - Protection of electrical
2013-02 equipment against foreign objects, water and access

Abbreviations used:

ASTM	American Society for Testing and Materials
DIN	German Institute for Standardization
DNVGL	Instruction of Det Norske Veritas / Germanischer Lloyd
EN	European Standard
ISO	International Organization for Standardization
ISTA	International Safe Transit Association
JDQ	John Deere Quality test
MAN	Engineering works Augsburg – Nuremberg (Standard)
MBN	Mercedes Benz standard
MIL STD	Military standard of the US Army
RTCA	Radio technical commission for aeronautics
VDE	Association for Electrical, Electronic and Information Technologies
VW	Factory standard of Volkswagen AG