

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-11012-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 09.01.2019 to 13.07.2022 Date of issue: 09.01.2019

Holder of certificate:

RST Rail System Testing GmbH
Walter-Kleinow-Ring 7, 16761 Hennigsdorf

Tests in the fields:

Manual non-destructive test methods (ultrasonic, radiographic, magnetic particle, liquid penetrant and visual testing), mechanical-technological testing, metallographic testing, as well as optical spark emission spectrometry (OES) of steel and ferrous materials and non-ferrous metal materials; tests in the areas of climatic, corrosive and mechanical-dynamic environmental testing, protection type testing and safety testing; fire investigation of materials, assemblies and systems used in transport engineering

Testing of the fire behaviour of construction products for which no indication of a relevant harmonised technical specification is required (item 3, Annex V (EU) No. 305/2011)

Abbreviations used: see last page

For the test areas marked with ** the laboratory is permitted to modify and develop new test procedures without obtaining prior notification and consent from DAkkS.

For the test areas marked with * the laboratory is permitted to use the test methods listed here with different revision levels of the standard without obtaining prior notification from DAkkS.**

The test methods listed are given by way of example. The testing laboratory has an up-to-date list of all test methods within the flexible scope of accreditation.

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1. Non-destructive testing

1.1 Ultrasonic testing

DIN EN ISO 16810 *** 2014-07	Non-destructive testing – Ultrasonic testing – <i>General principles (only section 9)</i>
DIN EN 10228-3 *** 2016-10	Non-destructive testing of steel forgings – Part 3: Ultrasonic testing of ferritic or martensitic steel forgings
DIN EN ISO 17640 *** 2011-04	Non-destructive testing of welds – Ultrasonic testing – Techniques, testing levels, and assessment (<i>only sections 7 – 10 and Annex A</i>)
DIN EN 12680-1 *** 2003-06	Founding – Ultrasonic examination – Part 1: Steel castings for general purposes
DIN EN 12680-2 *** 2003-06	Founding – Ultrasonic examination – Part 2: Steel castings for highly stressed components
DIN EN 12680-3 *** 2012-02	Founding – Ultrasonic examination – Part 3: Spheroidal graphite cast iron castings
DIN EN 10160 *** 1999-09	Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method)
DIN EN 14127 *** 2011-04	Non-destructive testing – Ultrasonic thickness measurement
SEP 1922 *** 1985-07	Ultrasonic testing of ferritic steel castings (<i>standard withdrawn</i>)
P-504-42-40 2006-11	Measurement of tension, pre-tension force and elastic elongation of screw connections by ultrasonic transit time measurement
P-504-10-40 2014-08	Ultrasonic testing of welds as per DIN EN ISO 17640 – Steel

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1.2 Radiographic testing ***

DIN EN ISO 5579 2014-04	Non-destructive testing – Radiographic testing of metallic materials using film and X- or gamma rays – Basic rules (<i>only section 6</i>)
DIN EN ISO 17636-1 2013-05	Non-destructive testing of welds – Radiographic testing
DIN EN 12681 2003-06	Founding – Radiographic examination

1.3 Magnetic particle testing ***

DIN EN ISO 9934-1 2017-03	Non-destructive testing – Magnetic particle testing – Part 1: General principles (<i>only sections 7-14</i>)
DIN EN 1369 2013-01	Founding – Magnetic particle testing
DIN EN 10228-1 2016-10	Non-destructive testing of steel forgings – Part 1: Magnetic particle testing
DIN EN ISO 17638 2017-03	Non-destructive testing of welds – Magnetic particle testing

1.4 Penetrant testing***

DIN EN ISO 3452-1 2014-09	Non-destructive testing – Liquid penetrant testing – Part 1: General principles (<i>only section 8</i>)
DIN EN 1371-1 2012-02	Founding – Liquid penetrant testing – Part 1: Sand, gravity die and low pressure die castings
DIN EN 1371-2 2015-04	Founding – Liquid penetrant testing – Part 2: Investment castings
DIN EN 10228-2 2016-10	Non-destructive testing of steel forgings – Part 2: Penetrant testing

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1.5 Visual testing***

DIN EN 13018 2016-06	Non-destructive testing – Visual testing – General principles (<i>only sections 5 and 6</i>)
DIN EN ISO 17637 2017-04	Non-destructive testing of welds – Visual testing of fusion-welded joints
DIN EN 1370 2012-03	Founding – Surface roughness inspection by visual tactile comparators

1.6 Test methods for welds (non-destructive) ***

AD 2000 – Merkblatt HP 5/3 2015-04	Manufacture and testing of pressure vessels – Manufacture and testing of joints – Non-destructive testing of welded joints
AD 2000 – Merkblatt HP 5/3 Anlage 1 2015-04	Manufacture and testing of pressure vessels – Non-destructive testing of welded joints – Minimum requirements for non-destructive testing methods

2. Destructive material testing

2.1 Mechanical-technological testing**

DIN EN ISO 6892-1 2017-02	Metallic materials – Tensile testing – Part 1: Method of test at room temperature
DIN EN 10002-1 2001-12	Metallic materials – Tensile testing – Part 1: Method of test at room temperature (<i>standard withdrawn</i>)
DIN EN ISO 7438 2016-07	Metallic materials – Bend test
DIN EN ISO 148-1 2017-05	Metallic materials – Charpy pendulum impact test – Part 1: Test methods

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2.2 Hardness testing**

DIN EN ISO 6506-1 2015-02	Metallic materials – Brinell hardness test – Part 1: Test methods
DIN EN ISO 6507-1 2006-03	Metallic materials – Vickers hardness test – Part 1: Test methods
DIN EN ISO 6508-1 2016-12	Metallic materials – Rockwell hardness test (scales A, B, C, D, E, F, G, H, K, N, T) – Part 1: Test methods (restriction: <i>only HRC hardness test</i>)
DIN EN ISO 16859-1 2016-02	Metallic materials – Leeb hardness test – Part 1: Test methods
DIN 50157-1 2008-04	Metallic materials – Hardness testing with portable measuring instruments operating with mechanical penetration depth – Part 1: Test methods
DIN 50159-1 2015-01	Metallic materials – Hardness testing with the UCI method – Part 1: Test methods
DIN ISO 7619-1 2012-02	Rubber, vulcanised or thermoplastic - Determination of indentation hardness - Part 1: Durometer method
DIN ISO 7619-2 2012-02	Rubber, vulcanised or thermoplastic - Determination of indentation hardness - Part 2: IRHD pocket meter method
DIN EN ISO 4516 2002-10	Metallic and other inorganic coatings – Vickers and Knoop microhardness tests (restriction: <i>only Vickers</i>)
DIN EN ISO 2639 2003-04	Steels – Determination and verification of the depth of carburized and hardened cases
DIN 50190-3 1979-03	Hardness depth of heat-treated parts – Determination of the effective depth of hardening after nitriding
DIN 50190-4 1999-09	Hardness depth of heat-treated parts – Part 4: Determination of the fusion hardening depth and the fusion depth
DIN EN 10328 2005-04	Iron and steel – Determination of the conventional depth of hardening after surface heating

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2.3 Test methods for welded joints**

DIN EN ISO 9016 2013-02	Destructive tests on welds in metallic materials – Impact tests – Test specimen location, notch orientation and examination
DIN EN ISO 4136 2013-02	Destructive tests on welds in metallic materials – Transverse tensile test
DIN EN ISO 5173 2012-02	Destructive tests on welds in metallic materials – Bend tests
DIN EN ISO 9017 2013-12	Destructive tests on welds in metallic materials – Fracture test
DIN EN ISO 17639 2013-12	Destructive tests on welds in metallic materials – Macroscopic and microscopic examination of welds
DIN EN ISO 14271 2012-11	Resistance welding – Vickers hardness testing (low-force and microhardness) of resistance spot, projection, and seam welds
DIN EN ISO 14273 2002-03	Specimen dimensions and procedure for shear testing resistance spot, seam and embossed projection welds
DIN ISO 22826 2008-08	Destructive tests on welds in metallic materials – Hardness testing of narrow joints welded by laser and electron beam (Vickers and Knoop hardness tests) (restriction: <i>only Vickers hardness test</i>)
DIN EN ISO 9015-1 2011-05	Destructive tests on welds in metallic materials – Hardness testing – Part 1: Hardness test on arc welded joints
DIN EN ISO 9015-2 2016-10	Destructive tests on welds in metallic materials – Hardness testing – Part 2: Microhardness testing of welded joints

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The test areas listed below are characterised by the measured variables, test parameters and test methods listed in the table.

Type of test	Measurand/ Test parameter	Measuring and test area		Measurement uncertainty ³⁾	Characteristic test methods
Mechanical material testing	Tensile/compressive force max clamping length: 700 mm	4 ... 400 kN		Class 1 ISO 7500-1	DIN EN ISO 6892-1 DIN 50106 DIN EN ISO 7438 DIN EN ISO 5173 DIN EN ISO 4136 DIN EN ISO 14273 DIN EN 61238-1
	Tensile/compressive force max clamping length: 750 mm	1 ... 2,000 N		Class 1 ISO 7500-1	
	Tensile/compressive force max clamping length: 760 mm	0.5 ... 50 kN		Class 1 ISO 7500-1	
	Tensile/compressive force max clamping length: 900 mm	1 ... 25 kN		Class 1 ISO 7500-1	
	Impact energy	0 ... 150 J -50 °C ... RT		As per DIN EN 10045-2 2 K	DIN EN ISO 148-1 DIN EN ISO 9016
	Brinell hardness	22.3 ... 600 BHN			
		BHN 10/3,000 BHN 5/250 BHN 5/62.5 BHN 2.5/187.5 BHN 2.5/62.5		As per DIN EN ISO 6506-2	DIN EN ISO 6506-1
	Vickers hardness	10 ... 3,000 HV			
		HV 0.005 HV 0.02 HV 0.1 HV 0.3 HV 1 HV 10	HV 0.01 HV 0.05 HV 0.2 HV 0.5 HV 5 HV 30	As per DIN EN ISO 6507-2	DIN EN ISO 6507-1 DIN EN ISO 9015-1 DIN EN ISO 9015-2 DIN EN ISO 14271 DIN ISO 22826 DIN EN ISO 4516 DIN EN ISO 2639 DIN EN 10328 DIN 50190-3 DIN 50190-4
	Rockwell hardness	20 ... 70 HRC		As per DIN EN ISO 6508-2	DIN EN ISO 6508-1

³⁾ Smallest achievable extended measurement uncertainty k=2

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2.4 Metallographic testing**

DIN EN ISO 643 2013-05	Steels – Micrographic determination of the apparent grain size
DIN 50602 1985-09	Metallographic examination – Microscopic examination of special steels using standard diagrams to assess the content of non-metallic inclusions <i>(standard withdrawn)</i>
ISO 4967 2013-07	Steel - Determination of content of nonmetallic inclusions - Micrographic method using standard diagrams
DIN EN ISO 945-1 2010-09	Microstructure of cast irons – Part 1: Graphite classification by visual analysis
DIN EN ISO 3887 2003-10	Steels – Determination of depth of decarburization
DIN EN ISO 1463 2004-08	Metallic and oxide coatings – Measurement of coating thickness – Microscopical method
DIN EN 10247 2007-07	Micrographic examination of the non-metallic inclusion content of steels using standard pictures
P-504-59-40 2009-11	Quantitative metallography – Interactive measurement of geometric parameters
P-504-60-40 2009-11	Quantitative metallography – Determination of phase fractions
P-504-61-40 2010-01	Scanning electron microscopic examination of surfaces
P-504-62-40 2010-01	Elemental analysis by energy dispersive X-ray spectroscopy
P-504-51-40 2009-09	Assessment of the effective stress amplitude during crack propagation in the vicinity of the crack inlet for fatigue fractures (vibration fractures) or fatigue cracks (vibration cracks)

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2.5 Chemical analysis**

P-504-01-40 Spectrometric analysis of iron, aluminium and copper
2017-05

P-504-57-40 Determination of carbon and sulphur by infrared adsorption
2017-05

2.6 Failure analysis**

VDI 3822 Blatt 2 Failure analysis – Failures caused by mechanical working conditions
2008-04

3. Environmental testing**

DIN EN 60068-2-1, Environmental testing – Part 2-1: Tests – Test A: Cold
VDE 0468-2-1
2008-01

DIN EN 60068-2-2 Environmental testing – Part 2-2: Tests – Test B: Dry heat
2008-05

DIN EN 60068-2-5 Environmental testing – Part 2: Tests – Test Sa: Simulated solar
2011-10 radiation at ground level

DIN EN 60068-2-6 Environmental testing – Part 2-6: Tests – Test Fc: Vibration
2008-10 (sinusoidal)

DIN EN 60068-2-11 Environmental testing – Part 2: Tests – Test Ka: Salt mist
2000-02

DIN EN 60068-2-14, Environmental testing – Part 2-14: Tests – Test N:
VDE 0468-2-14 Change of temperature
2010-04

DIN EN 60068-2-18 Environmental testing – Part 2-18: Tests – Test R and guidance:
2001-10 Water
(restriction: *only test Ra; method Ra2, test Rb method Rb1.2 and Rb2 and test Rc; method Rc1*)

DIN EN 60068-2-27, Environmental testing – Part 2-27: Tests – Test Ea and guidance:
VDE 0468-2-27 Shock
2010-02

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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 60068-2-42 2004-04	Environmental testing – Part 2-42: Tests – Test Kc: Sulphur dioxide test for contacts and connections
DIN EN 60068-2-43 2004-04	Environmental testing – Part 2-43: Tests – Test Kd: Hydrogen sulphide test for contacts and connections
DIN EN 60068-2-52 2017-03	Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)
DIN EN 60068-2-53, VDE 0468-2-53 2011-02	Environmental testing – Part 2-53: Tests and guidance: Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests
DIN EN 60068-2-57, VDE 0468-2-57 2015-10	Environmental testing – Part 2-57: Tests – Test Ff: Vibration – Time-history and sine-beat method
DIN EN 60068-2-60 VDE 0468-2-60 2016-06	Environmental testing – Part 2: Tests – Test Ke: Flowing mixed gas corrosion test
DIN EN 60068-2-64, VDE 0468-2-64 2009-04	Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance
DIN EN 60068-2-67 1996-07	Environmental testing – Part 2: Tests – Test Cy: Damp heat, steady state, accelerated test primarily intended for components
DIN EN 60068-2-68 1997-02	Environmental testing – Part 2: Tests – Test L: Dust and sand (restriction: only test La; method La2 and test Lc <i>method Lc1</i>)
DIN EN 60068-2-75 VDE 0468-2-75 2015-08	Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests
DIN EN 60068-2-78 2014-02	Environmental testing – Part 2: Tests – Test Cab: Damp heat, steady state

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DIN EN 60068-2-80 2006-05	Environmental testing – Part 2-80: Tests – Test Fi: Vibration – Mixed mode
DIN EN 50102, DIN EN 62262, VDE 0470-100 1997-09	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
DIN EN 62208, VDE 0660-511 2012-06	Empty enclosures for low-voltage switchgear and controlgear assemblies – General requirements (<i>only section 9</i>)
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 75220 1992-11	Ageing of automotive components in solar simulation units
DIN V 40046-36 2006-08	Environmental testing – Part 36: Tests – Test Kx: Sulphur dioxide low concentration for contacts and connections
DIN V 40046-37 2006-08	Environmental testing – Part 37: Tests – Test Ky: Hydrogen sulphide low concentration for contacts and connections
DIN EN ISO 6270-2 2016-09	Paints and varnishes – Determination of resistance to humidity – Part 2: Procedure for exposing test specimens in condensation-water atmospheres
DIN 50018 2013-05	Testing in a saturated atmosphere in the presence of sulphur dioxide
DIN EN 61439-1 VDE 0660-0600-1 2012-06	Low-voltage switchgear and controlgear assemblies – Part 1: General rules (<i>only sections 10.2.2; 10.2.3; 10.2.6 and 10.3</i>)
DIN EN 61439-5	Low-voltage switchgear and controlgear assemblies – Part 5:

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VDE 0660-600-5 2015-10	Assemblies for power distribution in public networks (<i>only sections 10.2.2, 10.2.3 and 10.2.6</i>)
DIN EN ISO 6988 1997-03	Metallic and other non-organic coatings – Sulphur dioxide test with general condensation of moisture
DIN EN ISO 9227 2012-09	Corrosion tests in artificial atmospheres – Salt spray tests
ASTM B 117 2011	Standard Practice for Operating Salt Spray (Fog) Apparatus
DIN EN 60529, VDE 0470-1 2014-09	Degrees of protection provided by enclosures (IP Code)
ISO 20653 2013-02	Road vehicles – Degrees of protection (IP code) – Protection of electrical equipment against foreign objects, water and access
DIN 40050-9 1993-05	Road vehicles; degrees of protection (IP-code); protection against foreign objects; water and contact; electrical equipment (withdrawn)
SAE Standard J 575 2012-04	Surface Vehicle Recommended Practice – Test Methods and Equipment for Lightning Devices and Components for Use on Vehicles Less Than 2032 mm in Overall Width – 4.3 Dust Exposure Test (<i>withdrawn</i> ; restriction: only section 4.3)
RTCA/DO-160G 2010-12	Environmental Conditions and Test Procedures for Airborne Equipment Section 3: Conditions of Test Section 4: Temperature and Altitude Section 5: Temperature Variation Section 6: Humidity Section 7: Operational Shocks and Crash Safety Section 8: Vibration Section 10: Waterproofness Section 11: Fluids Susceptibility Section 12: Sand and Dust Section 14: Salt Spray
DIN EN 61646, VDE 0126-32 2009-03	Thin-film terrestrial photovoltaic (PV) modules – Design qualification and type approval in accordance with 10.1; 10.3; 10.11; 10.12; 10.13; 10.14; 10.15; 10.16; 10.17; 10.18

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DIN EN 61215, VDE 0126-31 2006-02	Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval in accordance with 10.1; 10.3; 10.11; 10.12; 10.13; 10.14; 10.15; 10.16; 10.17; 10.18.3 variant 1
DIN EN 61701 2012-10	Salt mist corrosion testing of photovoltaic (PV) modules
DIN EN 50155, VDE 0115-200 2008-03	Railway applications – Electronic equipment used on rolling stock in accordance with 12.2.1; 12.2.3; 12.2.4; 12.2.5; 12.2.9; 12.2.10; 12.2.11; 12.2.12; 12.2.13 and 12.2.14
DIN EN 61373, VDE 0115-106 2011-04	Railway applications – Rolling stock equipment – Shock and vibration tests
DNV GL-CG-0339 2015-11	Environmental test specification for electrical, electronic and programmable equipment and systems
Lloyd’s Register 1996	LR TYPE APPROVAL SYSTEM - Test Specification Number 1 - Section 1 to Section 20 - Performance and Environmental test specification for control an electrical products (environmentally tested) to be used in marine and offshore applications <i>(withdrawn)</i>
Bureau Veritas 2000-06	Bureau Veritas-Rules and Regulations for the Classification of Steel Ships - Part III. Machinery-Systems - Chapter 19: Equipment-Remote control Integrated propulsion plant Automation notations - Section 19-25/1...19-25/7: Environmental tests <i>(withdrawn)</i>
Det Norske Veritas 2006-04	Standard for Certification No. 2.4 - Environmental Test Specification for Instrumentation and Automation Equipment

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MIL-STD-810 G 2008-10	Resistance of defence material to environmental factors - Environmental test methods and engineering guidelines Method 501.4 High Temperature Method 502.4 Low Temperature Method 503.4 Temperature Shock Method 507.4 Humidity Method 509.4 Salt Fog Method 510.4 Sand and Dust Method 514.5 Vibration Method 516.5 Shock
DIN EN ISO 2813 2015-02	Paints and varnishes – Determination of gloss value at 20°, 60° and 85°
DIN EN ISO 2409 2013-06	Paints and varnishes - Cross-cut test
DIN EN ISO 2812-1 2007-05	Paints and varnishes – Determination of resistance to liquids – Part 1: Immersion in liquids other than water

**4. Environmental testing: GOST tests in accordance with TR/TS – 001/2011 rules
"Safety of rolling stock"**

GOST 2582 2013	Electric traction machines Section 2.2.1 Vibration resistance Section 2.6 Insulation resistance of coils on electric machines Section 2.7.1 Permitted limit temperature rise of coil Section 2.7.6 Permitted limit temperature rise of bearings Section 2.8.1 Insulation resistance Section 2.12.3 Overcurrent Section 4.2.1.7 Speed test Section 4.2.1.8 Test for increased speed Section 4.2.1.23 Measurement of vibration level
GOST 9219-88 1988	Electric traction units Section 2.3 Permitted heating temperature Section 2.4 Electrical insulation resistance Section 2.7 Switching capacity of control circuit devices Section 2.8 Accuracy of quick switch Section 2.9 Permitted deviations of resistors from nominal values Section 2.11 Mechanical wear resistance

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ST SSFZhT CT-CL 188
2003

High-strength safety glass products for railway vehicles
Section 6.1 Determination of specific performance for electric heating
Section 6.2 Determination of insulation resistance in delivery condition
Section 6.3 Determination of electrical insulation resistance
Section 8 Determination of heat, cold and moisture resistance

NB ZhT CT-CL 135
2003

Safety in Rail transport – Accident-proof glazing components for railway vehicles, high-strength glass panes for operator's compartment and traction vehicle

The test areas listed below are characterised by the measured variables, test parameters and test methods listed in the table.

Type of test	Test parameter	test area	Uncertainty of measurement ³⁾	Characteristic test methods
Climatic tests	Relative humidity	10% ... 98% r.h.	3% r.h.	DIN EN 60068-2-1 DIN EN 60068-2-2 DIN EN 60068-2-14 DIN EN 60068-2-30 DIN EN 60068-2-78 DIN EN 50155 DIN EN ISO 6270-2
	Temperature/temperature change	-70 °C ... 220 °C	1.5 K	
	Temperature change rate	Up to 10 K/min	0.2 K/min	
Mechanical-dynamic tests	Acceleration	Vibration test systems: 0.5 m/s ² ... 800 m/s ²	1.1 %	DIN EN 60068-2-6 DIN EN 60068-2-27 DIN EN 60068-2-64 DIN EN 60068-2-80 DIN EN 50155 DIN EN 61373
	Frequency range	1 Hz ... 2200 Hz	0.1 %	
Combined tests Vibrations/shocks with Temperature	Temperature/temperature change	-65 °C ... 150 °C	1.5 K	DIN EN 60068-2-1 DIN EN 60068-2-2 DIN EN 60068-2-14 in combination with:
	Temperature change rate	Up to 1 K/min	0.2 K/min	DIN EN 60068-2-6 DIN EN 60068-2-27 DIN EN 60068-2-53 DIN EN 60068-2-80
	Acceleration	Vibration test systems: 0.5 m/s ² ... 490.3 m/s ²	1.1 %	

³⁾ Smallest achievable extended measurement uncertainty k=2

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Type of test	Test parameter	test area	Uncertainty of measurement ³⁾	Characteristic test methods
		Shock table: 800 m/s ² ...1500 m/s ²	2.5 %	DIN EN 60068-2-64
	Frequency range	2 Hz ... 2200 Hz	0.1 %	
Salt mist tests	Salt concentration	0.5% ... 5%	0.2 %	DIN EN 60068-2-11 DIN EN 60068-2-52 DIN EN ISO 9227 DIN EN 61701
	Temperature	20 °C ... 55 °C	2 K	
Corrosive gas tests	H ₂ S	0.01 ppm ... 25 ppm	-	DIN EN 60068-2-60 DIN EN 60068-2-42 DIN EN 60068-2-43 DIN V 40046-36 DIN V 40046-37 DIN EN ISO 6988 DIN 50018
	SO ₂	0.05 ppm ... 40 ppm	-	
	Cl ₂	0.005 ppm ... 0.03 ppm	-	
	NO ₂	0.03 ppm ... 0.3 ppm	-	
	Temperature	25 °C ... 60 °C	1.0 K	
	Relative humidity	50 % ... 95 % r.h.	3% r.h.	
Dust tests	Flow speed	0.5 m/s ... 18 m/s	0.1 m/s	DIN EN 60068-2-68 DIN EN 60529 DIN 40050-9
	Flow direction	horizontal and vertical	-	
	Dust	Talc, Arizona dust, silicon dioxide	-	

³⁾ Smallest achievable extended measurement uncertainty k=2

DIN VDE 0110-20
1990-08

Insulation co-ordination for electrical equipment within low-voltage systems – Partial discharge tests – Application guide

DIN EN 60270,
VDE 0434
2016-11

High-voltage test techniques – Partial discharge measurements (VDE guideline)

DIN IEC 60060-1,
VDE 0432- 1
2011-10

High-voltage test techniques – Part 1: General definitions and test requirements (*only sections 4.3.5 and 5.3*)

DIN EN ISO 11664-4
2012-06

Colorimetry – Part 4: CIE 1976 L*a*b* Colour space

DIN 53236
1983-01

Testing of colouring materials; conditions of measurement and evaluation for the determination of colour differences for paint

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DIN EN ISO 3668 2001-12	coatings, similar coatings and plastics Paints and varnishes – Visual comparison of the colour of paints
DIN EN ISO 105-A05 1997-07	Textiles - Tests for colour fastness - Part A05: Instrumental assessment of change in colour for determination of grey scale rating
DIN EN ISO 4628-1 2016-07	Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of changes in appearance – Part 1: General introduction and designation system
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
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 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

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DIN 50905-1 2009-09	Corrosion of metals – Corrosion testing – Part 1: General guidance
DIN 50905-2 1987-01	Corrosion of metals – Corrosion testing – Corrosion characteristics under uniform corrosion attack
DIN 50905-3 1987-01	Corrosion of metals – Corrosion testing – Corrosion characteristics under nonuniform and localized corrosion attack without mechanical stress
DIN EN ISO 10289 2001-04	Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates – Rating of test specimens and manufactured articles subjected to corrosion tests
Bureau Veritas 2000-06	Bureau Veritas - Rules for the Classification of Steel Ships - Part C: Machinery Systems and Fire Protection Chapter 2-3 Electrical & Automation Systems
DIN EN 60243-1 VDE 0303-21 2014-01	Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies
DIN EN 60243-2 VDE 0303-22 2014-08	Electric strength of insulating materials – Test methods – Part 2: Additional requirements for tests using direct voltage

5. *Fire testing*

5.1 *Fire testing of plastics and materials in electrical engineering****

DIN EN ISO 4589-2 2006-06	Plastics – Determination of burning behaviour by oxygen index – Part 2: Ambient temperature test
DIN EN 60695-2-11 VDE 0471-2-11 2014-11	Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)
DIN EN 60695-2-12 VDE 0471-2-12 2015-01	Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials

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DIN EN 60695-2-13 VDE 0471-2-13 2015-01	Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials
DIN EN 60695-11-3 VDE 0471-11-3 2014-10	Fire hazard testing – Part 11-3: Test flames – 500 W flames – Apparatus and confirmational test methods
DIN EN 60695-11-4 VDE 0471-11-4 2013-05	Fire hazard testing – Part 11-4: Test flames –50 W flames – Apparatus and confirmational test methods
DIN EN 60695-11-5 VDE 0471-11-5 2005-11	Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance
DIN EN 60695-11-10 VDE 0471-11-10 2015-10	Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods
DIN EN 60695-11-20 VDE 0471-11-20 2016-04	Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods
DIN EN ISO 9773 2004-02 ISO 9772 2012-09	Plastics – Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source Cellular plastics - Determination of horizontal burning characteristics of small specimens subjected to a small flame

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5.2 Fire testing of materials and components in rail vehicles***

DIN 54341 1988-01	Testing of seats in railways for public traffic; determination of burning behaviour with a paper pillow ignition source
DIN 54837 2007-12	Testing of materials, small components and component sections for railway vehicles – Determination of burning behaviour using a gas burner
DIN 5510-2 2009-05	Preventive fire protection in railway vehicles – Part 2: Fire behaviour and fire side effects of materials and parts – Classification, requirements and test methods – Testing of seats in railways for public traffic (here: <i>Annex C – Determining the toxicity of fire effluents</i>)
DIN EN 45545-2 2016-02	Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components (<i>Annex C: Testing methods for determination of toxic gases from railway products</i> <i>Annex B: Fire test method for seating</i>)
DIN 53438-2 1984-06	Testing of combustible materials – Response to ignition by a small flame – Edge ignition
DIN 53438-3 1984-06	Testing of combustible materials – Response to ignition by a small flame – Surface ignition
DIN EN ISO 5659-2 2013-03	Plastics – Smoke generation – Part 2: Determination of optical density by a single-chamber test
ISO 5658-2 2006-09	Reaction to fire tests – Spread of flame – Part 2: Lateral spread on building and transport products in vertical configuration
ISO 5660-1 2015-03	Reaction to fire tests – Heat release, smoke production and mass loss rate – Part 1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)
DIN EN ISO 9239-1 2010-11	Reaction to fire tests for floorings – Part 1: Determination of the burning behaviour using a radiant heat source
ISO/TR 9705-2 2001-05	Reaction-to-fire tests – Full-scale room tests for surface products – Part 2

5.3 Fire testing of materials and components in motor vehicles***

DIN 75200 1980-09	Determination of burning behaviour of interior materials in motor vehicles
ISO 3795 1989-10	Road vehicles and tractors and machinery for agriculture and forestry - Determination of burning behaviour of interior materials
RL 95/28/EG 1995-10	Directive 95/28/EC of the European Parliament and of the Council of 24 October 1995 relating to the burning behaviour of materials used in the interior construction of certain categories of motor vehicle - Annex IV: Test to determine the horizontal burning rate of materials - Annex V: Test to determine the melting behaviour of materials Annex VI: Test to determine the vertical burning rate of materials
ECE R 118 2015-04	Burning behaviour of materials used in the interior construction of motor vehicles Annex 6: Tests to determine the horizontal burning rate Annex 7: Test to determine the melting behaviour of materials Annex 8: Test to determine the vertical burning rate of materials
FMVSS 302 2013-10	Standard No. 302; Flammability of interior materials

5.4 Fire testing of materials and components in ships***

IMO 2010 FTP Code Annex 1 Part 1 IMO Resolution MSC.307(88) 2010-12	Non-combustibility test
IMO 2010 FTP Code Annex 1 Part 2 IMO Resolution MSC.307(88) 2010-12	Smoke and Toxicity test
IMO 2010 FTP Code Annex 1 Part 5 IMO Resolution MSC.307(88) 2010-12	Test for surface flammability (Test for surface materials and primary deck coverings)

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IMO 2010 FTP Code Annex 1 Part 7 IMO Resolution MSC.307(88) 2010-12	Test for vertically supported textiles and films Only Annex 1 and 2
IMO 2010 FTP Code Annex 1 Part 8 IMO Resolution MSC.307(88) 2010-12	Test for upholstered furniture
IMO 2010 FTP Code Annex 1 Part 9 IMO Resolution MSC.307(88) 2010-12	Test for bedding components With the exception of the cleaning procedures set out in sections 6.1, 6.2 and 6.3
IMO 2010 FTP Code Annex 1 Part 10, Appendix 2 IMO Resolution MSC.307(88) 2010-12	Fire Test Procedures for Heat Release, Smoke Emission and Mass Loss Rate for Materials used for furniture and other Componentes of High- Speed Craft

5.5 Fire tests of mattresses, upholstered furniture and textiles***

DIN EN 597-1 2016-03	Furniture – Assessment of the ignitability of mattresses and and upholstered bed bases – Part 1: Ignition source: smouldering cigarette
DIN EN 597-2 2016-03	Furniture – Assessment of the ignitability of mattresses and and upholstered bed bases – Part 2: Ignition source: Ignition source match flame equivalent
DIN EN ISO 12952-1 2011-01	Textiles – Assessment of the ignitability of bedding items – Part 1: Ignition source: smouldering cigarette (<i>without section 8: Cleaning</i>)
DIN EN ISO 12952-2 2010-02	Textiles – Assessment of the ignitability of bedding items – Part 2: Ignition source: match-flame equivalent (<i>without section 8: Cleaning</i>)
DIN EN 1021-1 2014-10	Furniture – Assessment of the ignitability of upholstered furniture – Part 1: Ignition source: smouldering cigarette
DIN EN 1021-2 2014-10	Furniture – Assessment of the ignitability of upholstered furniture – Part 2: Ignition source: match flame equivalent

5.6 Fire testing: GOST tests in accordance with TR/TS – 001/2011 rules

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"Safety of rolling stock"***

GOST 12.1.044-89 1989	Standard system for occupational safety – Fire and explosion hazard of substances and materials – Characteristics and determination methods Section 4.3 Method for experimental testing of the group of highly combustible and combustible solids and materials Section 4.19 Method for the experimental determination of the flame propagation index Section 4.14 Method for the experimental determination of the oxygen index
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5.7 Fire testing in accordance with UIC***

UIC 564-2 Annex 4 1991-01	Test method for determining the fire resistance of non-thermoplastic materials
UIC 564-2 Annex 5 1991-01	Test method for determining the fire resistance of coated and uncoated textiles
UIC 564-2 Annex 6 1991-01	Test method for determining the resistance of rubber door and window seals to fire
UIC 564-2 Annex 7 1991-01	Test method for determining the fire resistance of materials by measuring the oxygen index
UIC 564-2 Annex 8 1991-01	Test method for determining the resistance of foam materials to fire
UIC 564-2 Annex 10 1991-01	Test method for determining the resistance of interconnecting gangway rubber flanges to fire
UIC 564-2 Annex 11 1991-01	Test method for determining the resistance of rigid thermoplastic materials to fire
UIC 564-2	Test method for determining the fire resistance of floor coverings

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Annex 12
1991-01

UIC 564-2 Method for testing the fire behaviour of seats
Annex 13
1991-01

UIC 564-2 Test method for determining light attenuation by flue gases for all
Annex 15 materials
1991-01

5.8 Fire testing of building materials and building components***

DIN 4102-1 Fire behaviour of building materials and building components - Part
2003-10 1: Building components; Definitions, requirements and testing
*(only section 5, furnace test and 6.2, without creation of test
certificates)*

DIN 4102-14 Fire behaviour of building materials and elements; determination
1990-05 of the burning behaviour of floor covering systems using a radiant
heat source

5.9 Testing of the fire behaviour of construction products for which no indication of a relevant harmonised technical specification is required (item 3, Annex V (EU) No. 305/2011)

DIN EN ISO 1182 Reaction to fire tests for products – Non-combustibility test
2010-10

DIN EN ISO 11925-2 Reaction to fire tests – Ignitability of products subjected to direct
2011-02 impingement of flame – Part 2: Single-flame source test

DIN EN ISO 1716 Reaction to fire tests for products – Determination of the gross
2010-11 heat of combustion (calorific value)

DIN EN ISO 9239-1 Reaction to fire tests for floorings – Part 1: Determination of the
burning behaviour using a radiant heat source

In conjunction with:

*DIN EN 13501-1 Fire classification of construction products and building
2010-01 elements - Part 1: Classification using data from
reaction to fire tests*

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The requirements for a testing laboratory in accordance with Article 43 of the Construction Products Regulation are met.

Abbreviations used:

ASTM	American Society for Testing and Materials
AD	Arbeitsgemeinschaft Druckbehälter (pressure vessel working group)
CEN TS	European Committee for Standardization
ECE	Economic Commission for Europe
FMVSS	Federal Motor Vehicle Safety Standard
GOST	Gossudarstvennyj Standart (state standards office of the Russian Federation)
IMO	International Maritime Organisation
MIL-STD	Military Standard
NB ZhT CT-CL	Russian safety standard for rail transport
P-504-xx-xx	In-house method of RST Rail System Testing GmbH
RTCA	Radio Technical Commission for Aeronautics
SAE	Society (Standard) of Automotive Engineers (American automotive standardization organisation)
SEP	Stahl-Eisen-Prüfblätter published by Verein Deutscher Eisenhüttenleute
ST SSFZhT CT-CL	Russian standard for rail transport
TR/TS	Technical Rules / Customs Union (Tamozenyj Soyuz)
UIC	Union Internationale des Chemins de Fer (International Union of Railways)
VDA automotive industry)	Verband der Automobilindustrie e.V. (Association of the German automotive industry)
VDE Engineers)	Verband Deutscher Elektrotechniker (Association of German Electrical Engineers)
VDI	Verein Deutscher Ingenieure (Association of German Engineers)