Deutsche Akkreditierungsstelle GmbH

Annex to the accreditation certificate D-PL-11012-01-01 in accordance with DIN EN ISO/IEC 17025:2018

Valid from: 21.07.2022

Issue date: 21.07.2022

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, chemical resistance 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)

For the test areas marked with *, the laboratory is permitted to freely select standard test methods or equivalent methods without obtaining prior notification and consent from DAkkS.

The test methods listed are given by way of example.

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 testing laboratory has an up-to-date list of all test methods within the flexible scope of accreditation.

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

The certificate together with the annex 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 (DAkkS) at https://www.dakks.de/en/accredited-bodies-search.html

Abbreviations used: see last page

1 Non-destructive testing

1.1 Ultrasonic testing ***

DIN EN ISO 16810 2014-07	Non-destructive testing – Ultrasonic testing – General principles *(only section 9)*
DIN EN ISO 17640 2011-04	Non-destructive testing of welds – Ultrasonic testing – Techniques, testing levels, and assessment *(only sections 7-10 and Annex A)*
DIN EN 10160 1999-09	Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method)
DIN EN 10228-3 2016-10	Non-destructive testing of steel forgings – Part 3: Ultrasonic testing of ferritic or martensitic steel forgings
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 ISO 16809 2020-02	Non-destructive testing – Ultrasonic thickness measurement
SEP 1922 1985-07	Ultrasonic testing of ferritic steel castings *(standard withdrawn)*

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 *(only section 6)*
DIN EN ISO 17636-1 2013-05	Non-destructive testing of welds – Radiographic testing
DIN EN 12681-1 2018-02	Founding – Radiographic testing – Part 1: Film techniques

1.3 Magnetic particle testing ***

DIN EN ISO 9934-1 2017-03	Non-destructive testing – Magnetic particle testing – Part 1: General principles *(only sections 7-14)*
DIN EN ISO 17638 2017-03	Non-destructive testing of welds – Magnetic particle testing
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

1.4 Penetrant testing***

DIN EN ISO 3452-1 2022-02	Non-destructive testing – Penetrant testing – Part 1: General principles *(only section 8)*
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

1.5 Visual testing***

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
DIN EN 13018 2016-06	Non-destructive testing – Visual testing – General principles *(only sections 5 and 6)*

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

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 (standard withdrawn)

2. Destructive material testing

2.1. Mechanical-technological testing (tensile, compression, bend tests, pendulum impact tests on metallic or non-metallic specimens, components, assemblies, sample sections)*

DIN EN ISO 148-1 2017-05	Metallic materials – Charpy pendulum impact test – Part 1: Test method
DIN EN ISO 6892-1 2020-06	Metallic materials – Tensile testing – Part 1: Method of test at room temperature
DIN EN ISO 7438 2016-07	Metallic materials – Bend test
DIN EN 10002-1 2001-12	Metallic materials – Tensile testing – Part 1: Method of test at room temperature *(standard withdrawn)*
DIN EN 61238-1-1 VDE 0220-238-1-1 2020-11	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 (U_0 = 1,2 kV) tested on non-insulated conductors *(restriction: only section 7*)

DIN EN 61238-1-2 VDE 0220-238-1-2 2020-11	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 (U□ = 1,2 kV) tested on insulated conductors *(restriction: only section 7*)
DIN EN 61238-1-3 VDE 0220-238-1-3 2020-11	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 (U□ = 1,2 kV) up to 36 kV (U□ = 42 kV) tested on non-insulated conductors *(restriction: only section 7*)
P-504-82-40-00 2022-07	Determination of force-traverse path curves in tension and compression directions *(not flexibly accredited*)

2.2 Hardness testing***

DIN EN ISO 2639 2003-04	Steels – Determination and verification of the depth of carburized and hardened cases
DIN EN ISO 4516 2002-10	Metallic and other inorganic coatings – Vickers and Knoop microhardness tests (restriction: *only Vickers*)
DIN EN ISO 6506-1 2015-02	Metallic materials – Brinell hardness test – Part 1: Test method
DIN EN ISO 6507-1 2018-07	Metallic materials – Vickers hardness test – Part 1: Test method
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 method (restriction: *only HRC hardness test*)
DIN EN ISO 16859-1 2016-02	Metallic materials – Leeb hardness test – Part 1: Test method
DIN EN 10328 2005-04	Iron and steel – Determination of the conventional depth of hardening after surface heating
DIN 50157-1 2008-04	Metallic materials – Hardness testing with portable measuring instruments operating with mechanical penetration depth – Part 1: Test method

DIN 50159-1 2015-01	Metallic materials – Hardness testing with the UCI method – Part 1: Test method
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

2.3 Test methods for welded joints***

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: *only Vickers hardness test*)
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 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
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 9017 2013-12	Destructive tests on welds in metallic materials – Fracture test
DIN EN ISO 14271 2012-11	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 EN ISO 17639 2013-12	Destructive tests on welds in metallic materials – Macroscopic and microscopic examination of welds

2.4 Metallographic testing (microstructural composition; degree of purity; grain size; phase fractions; layer thickness; depth of decarburisation; surface defects on metallic or non-metallic specimens, components, assemblies, specimen sections)*

ISO 4967 2013-07	Steel – Determination of content of nonmetallic inclusions – Micrographic method using standard diagrams
DIN EN ISO 643 2013-05	Steels – Micrographic determination of the apparent grain size
DIN EN ISO 945-1 2010-09	Microstructure of cast irons – Part 1: Graphite classification by visual analysis
DIN EN ISO 1463 2004-08	Metallic and oxide coatings – Measurement of coating thickness – Microscopical method
DIN EN ISO 3887 2003-10	Steels – Determination of depth of decarburization
DIN EN 10247 2007-07	Micrographic examination of the non-metallic inclusion content of steels using standard pictures
DIN 50602 1985-09	Metallographic examination – Microscopic examination of special steels using standard diagrams to assess the content of non-metallic inclusions *(standard withdrawn)*
P-504-59-40 2022-05	Quantitative metallography – Interactive measurement of geometric parameters *(not flexibly accredited*)
P-504-60-40 2009-11	Quantitative metallography – Determination of phase fractions *(not flexibly accredited*)
P-504-61-40 2010-01	Scanning electron microscopic examination of surfaces *(not flexibly accredited*)
P-504-62-40 2010-01	Elemental analysis by energy dispersive X-ray spectroscopy *(not flexibly accredited*)

2.5 Chemical analysis

P-504-01-40 2021-10	Spectrometric analysis of iron, aluminium and copper
P-504-57-40 2017-05	Determination of carbon and sulphur by infrared adsorption

3. Environmental testing (climatic tests; mechanical-dynamic tests; combined vibration/impact tests with climate overlay; salt spray tests; harmful gas tests with H_2S, SO_2, Cl_2, NO_2; dust tests; water tests; sun simulation; chemical resistance tests on semi-finished technical products, parts, components and products) *

ISO 16750-5 2010-04	Road vehicles – Environmental; conditions and testing for electrical and electronic equipment – Part 5: chemical loads
ISO 20653 2013-02	Road vehicles - Degrees of protection (IP code) – Protection of electrical equipment against foreign objects, water and access
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
DIN EN ISO 2813 2015-02	Paints and varnishes – Determination of gloss value at 20°, 60° and 85°
DIN EN ISO 4892-2 2013-06	Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps
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 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
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 50155, VDE 0115-200 2018-05	Railway applications – Electronic equipment used on rolling stock in accordance with 13.4.1, 13.4.4, 13.4.5, 13.4.6, 13.4.7, 13.4.9, 13.4.10, 13.4.11, 13.4.12 and 13.4.13
DIN EN 20105-A02 1994-10	Textiles - Tests for colour fastness - Part A02: Grey scale for assessing change in colour
DIN EN 60068-2-1, VDE 0468-2-1 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 IEC 60068-2-5 2019-02	Environmental testing – Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering
DIN EN 60068-2-6 2008-10	Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)
DIN EN 60068-2-11 2000-02	Environmental testing – Part 2: Tests – Test Ka: Salt mist
DIN EN 60068-2-13 2000-02	Environmental testing – Part 2: Tests; test M: Low air pressure
DIN EN 60068-2-14, VDE 0468-2-14 2010-04	Environmental testing – Part 2-14: Tests – Test N: Change of temperature
DIN EN 60068-2-18 2001-10	Environmental testing – Part 2-18: Tests – Test R and guidance: Water (restriction: *only test Ra; method Ra2, test Rb method Rb1.2 and Rb2 and test Rc; method Rc1*)
DIN EN 60068-2-27, VDE 0468-2-27 2010-02	Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock
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 *method Lc1*)
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
DIN EN 60068-2-80 2006-05	Environmental testing – Part 2-80: Tests – Test Fi: Vibration – Mixed mode
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 60529, VDE 0470-1 2014-09	Degrees of protection provided by enclosures (IP Code)
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 61373, VDE 0115-106 2011-04	Railway applications – Rolling stock equipment – Shock and vibration tests
DIN EN 61439-1 VDE 0660-0600-1 2012-06	Low-voltage switchgear and controlgear assemblies – Part 1: General rules *(only sections 10.2.2; 10.2.3; 10.2.6 and 10.3)*
DIN EN 61439-5 VDE 0660-600-5 2015-10	Low-voltage switchgear and controlgear assemblies – Part 5: Assemblies for power distribution in public networks *(only sections 10.2.2, 10.2.3 and 10.2.6)*
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
DIN EN 62208, VDE 0660-511 2012-06	Empty enclosures for low-voltage switchgear and controlgear assemblies – General requirements *(only section 9)*
DIN EN 61701 2012-10	Salt mist corrosion testing of photovoltaic (PV) modules
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 75220 1992-11	Ageing of automotive components in solar simulation units

DIN 50018 2013-05	Testing in a saturated atmosphere in the presence of sulphur dioxide
ASTM B 117 2011	Standard Practice for Operating Salt Spray (Fog) Apparatus
SAE-Norm 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 *(withdrawn;* (withdrawn; 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
DNV GL-CG-0339 2015-11	Environmental test specification for electrical, electronic and programmable equipment and systems *(not flexibly accredited*)
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 *(withdrawn)* *(not flexibly accredited*)

MIL-STD-810 H 2019-01	Resistance of defence material to environmental factors - Environmental test methods and engineering guidelines Method 500.6 Low Pressure (Altitude) Method 501.7 High Temperature Method 502.7 Low Temperature Method 503.7 Temperature Shock Method 504.3 Contamination by Fluids Method 505.7 Solar Radiation (Sunshine) Method 506.6 Rain Method 507.6 Humidity Method 509.7 Salt Fog Method 510.7 Sand and Dust Method 512.6 Immersion Method 514.8 Vibration Method 516.8 Shock
VW PV 1200 2004-04	Vehicle components – Climatic resistance test (+ 80/-40) °C *(not flexibly accredited*)
VW PV 1209 2016-02	Attached parts with a zinc or zinc alloy coating and aluminium components (e.g. heat exchanger, refrigerant line) – Corrosion test (climate corrosion change test) *(not flexibly accredited*)
VW PV 1210 2016-02	Body and attached parts – Corrosion test *(not flexibly accredited*)

VW 80000 2013-06	Electrical and electronic components in motor vehicles up to 3.5 t – General requirements, test conditions and tests *(not flexibly accredited*) M-01 Free fall M-03 Dust test M-04 Vibration test M-05 Mechanical shock M-06 Continuous mechanical shock K-01 High/low temperature storage K-02 Step temperature test K-03 Low temperature operation K-05 Temperature shock (component) K-06 Salt spray test with operation, outdoor K-07 Salt spray test with operation, indoor K-08 Damp heat, cyclic K-09 Damp heat, cyclic (with frost) K-10 Water protection - IPX0 to IPX6K K-11 High pressure/steam jet cleaning K-12 Thermal shock with surge water K-13 Thermal shock immersion K-14 Damp heat constant K-15 b Climatic test for components with waterproof enclosures K-16 Thermal shock (without enclosure) K-17 Solar radiation K-18 Harmful gas test C-01 Chemical tests
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 3668 2001-12	Paints and varnishes – Visual comparison of the colour of paints
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 uniform 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 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
DIN EN ISO 11664-4 2012-06	Colorimetry – Part 4: CIE 1976 L*a*b* Colour space
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 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
DIN EN 60270, VDE 0434 2016-11	High-voltage test techniques – Partial discharge measurements (VDE guideline)
DIN VDE 0110-20 1990-08	Insulation co-ordination for electrical equipment within low-voltage systems – Partial discharge tests – Application guide
DIN 53236 1983-01	Testing of colouring materials; conditions of measurement and evaluation for the determination of colour differences for paint coatings, similar coatings and plastics

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 *(not flexibly accredited*)

4. Fire testing ***

4.1 Fire testing of plastics and materials in electrical engineering

ISO 9772 2012-09	Cellular plastics - Determination of horizontal burning characteristics of small specimens subjected to a small flame
DIN EN ISO 4589-2 2006-06	Plastics – Determination of burning behaviour by oxygen index – Part 2: Ambient temperature test
DIN EN ISO 9773 2004-02	Plastics – Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source
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
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 2014-10	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
UL 94 2013-03	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

4.2 Fire testing of materials and components in rail vehicles

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)
ISO/TR 9705-2 2001-05	Reaction-to-fire tests – Full-scale room tests for surface products – Part 2: Technical background and guidance
DIN EN ISO 5659-2 2013-03	Plastics – Smoke generation – Part 2: Determination of optical density by a single-chamber test
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
DIN EN 16989 2018-08	Railway applications – Fire protection on railway vehicles – Fire behaviour test for a complete seat
DIN EN 17084 2019-06	Railway applications – Fire protection on railway vehicles – Toxicity test of materials and components

DIN EN 45545-2 2016-02	Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components *(Annex C: Testing methods for determination of toxic gases from railway products* *Annex B: Fire test method for seating)* **In conjunction with:** *DIN EN 45545-2 2020-10* — *Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components*
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: *Annex C – Determining the toxicity of fire effluents*) *(standard withdrawn)*
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 54341 1988-01	Testing of seats in railways for public traffic; determination of burning behaviour with a paper pillow ignition source *(standard withdrawn)*
DIN 54837 2007-12	Testing of materials, small components and component sections for railway vehicles – Determination of burning behaviour using a gas burner *(standard withdrawn)*

4.3 Fire testing of materials and components in motor vehicles

ISO 3795 1989-10	Road vehicles and tractors and machinery for agriculture and forestry – Determination of burning behaviour of interior materials
ISO 6722-1 2011-10	Road vehicles - 60 V and 600 V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables Section 5.22 Resistance to flame propagation

ISO 6722-2 2013-12	Road vehicles - 60 V and 600 V single-core cables - Part 2: Dimensions, test methods and requirements for aluminium conductor cables Section 5.22 Resistance to flame propagation
DIN 75200 1980-09	Determination of burning behaviour of interior materials in motor vehicles
RL 95/28/EC 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
UN ECE R 118 ÄS03 2017	Uniform technical prescriptions concerning the burning behaviour and/or the characteristic of materials, fuel or lubricants used in the construction of certain categories of motor vehicles Annex 6: Test 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 Annex 9: Test to determine the property of materials to repel fuel or lubricant Annex 10: Test to determine the flame resistance of electrical cables
FMVSS 302 2013-10	Standard No. 302; Flammability of interior materials
SAE J369 2019	Flammability of Polymeric Interior Materials – Horizontal Test Method
ASTM D 5132 2020	Standard Test Method of Horizontal Burning rate of Polymeric Materials used in Occupant Compartments of Motor Vehicles

4.4 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)
IMO 2010 FTP Code Annex 1 Part 7 IMO Resolution MSC.307(88) 2010-12	Test for vertically supported textiles and films Nur Anhang 1 und 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

4.5 Fire tests of mattresses, upholstered furniture and textiles

DIN EN ISO 12952-1 2011-01	Textiles – Assessment of the ignitability of bedding items – Part 1: Ignition source: smouldering cigarette (*without section 8: Cleaning*)
DIN EN ISO 12952-2 2011-01	Textiles – Assessment of the ignitability of bedding items – Part 2: Ignition source: match-flame equivalent (*without section 8: Cleaning*)

DIN EN 597-1 2016-03	Furniture – Assessment of the ignitability of mattresses and upholstered bed bases – Part 1: Ignition source: smouldering cigarette
DIN EN 597-2 2016-03	Furniture – Assessment of the ignitability of mattresses and upholstered bed bases – Part 2: Ignition source: Ignition source match flame equivalent
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
DIN 66084 2021-02	Classification of the burning behaviour of upholstery compounds *(only Annex A)*
BS 5852 2006-03	Methods of test for assessment of the ignitability of upholstered seating by smouldering and flaming ignition sources Section 8 Smouldering ignition source 0 cigarette Section 9.2 Butan gas flame ignition source 1
BS 7177 2008-01	Specification for resistance to ignition of mattresses, mattress pads, divans and bed bases

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

4.7 Fire testing in accordance with ASTM

ASTM C 1166 2006	Standard Test Method for Flame Propagation of dense and Cellular Elastomeric Gaskets and Accessories
ASTM D 2863 2019	Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM D 3675 2019	Standard Test Method for Surface Flammability of Flexible Cellular Materials Using a Radiant Heat Energy Source
ASTM E 136 2019	Standard Test Method for Assessing Combustibility Materials using a Vertical Tube Furnace at 750 °C *(option B only)*
ASTM E 162 2016	Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
ASTM E 648 2019	Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
ASTM E 662 2019	Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
ASTM E 970 2017	Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source
ASTM E 1317 2019	Standard Test Method for Flammability of Surface Finishes
ASTM E 1354 2017-07	Heat and visible Smoke Release Rates for Materials and Products using an Oxygen Consumption Calorimeter
ASTM E 2652 2018	Standard Test Method for Assessing Combustibility of Materials using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750 °C
NFPA 253 2019	Standard Test Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

4.8 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 Annex 12 1991-01	Test method for determining the fire resistance of floor coverings
UIC 564-2 Annex 13 1991-01	Method for testing the fire behaviour of seats
UIC 564-2 Annex 15 1991-01	Test method for determining light attenuation by flue gases for all materials

4.9 Fire testing of building materials and building components

DIN 4102-1 1998-05	Fire behaviour of building materials and building components – Part 1: Building components; Definitions, requirements and testing *(only section 5, furnace test and 6.2, without creation of test certificates)*

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

4.10 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)

EN ISO 1182 2020	Reaction to fire tests for products – Non-combustibility test
EN ISO 1716 2018	Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value)
EN ISO 9239-1 2010	Reaction to fire tests for floorings – Part 1: Determination of the burning behaviour using a radiant heat source
EN ISO 11925-2 2011-02	Reaction to fire tests – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test

In conjunction with:

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

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)
BS	British Standard
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
NFPA	National Fire Prevention Association
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 Regulation / Customs Union-(Tamozhenyj Soyuz)
UIC	Union Internationale des Chemins de Fer (International Union of Railways)
VDA	Verband der Automobilindustrie e.V. (Association of the German automotive industry)
VDE	Verband Deutscher Elektrotechniker (Association of German Electrical Engineers)
VDI	Verein Deutscher Ingenieure (Association of German Engineers)