

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**Industrieanlagen Betriebsgesellschaft mbH (IABG)**  
**Fatigue Strength Laboratory (IBL)**

**Einsteinstraße 20, 85521 Ottobrunn**  
**Zum Windkanal 17, 01109 Dresden**

**Examinations in the following areas:**

- 1) Hardness tests on metallic materials and plastics  
Metallographic tests on metallic materials  
Evaluation of the adhesion behaviour of coatings  
Surface tests on components
- 2) Mechanical-technological tests on metallic materials and plastics  
Fatigue tests on metallic material samples and components
- 3) Vibration testing and earthquake simulation
- 4) Climatic tests on components
- 5) Mechanical strength and functional tests on components of railway vehicles and construction machinery
- 6) Manual and mechanical non-destructive testing (penetrant, magnetic particle and visual testing) on metallic components, fibre-reinforced materials, plastics and composites

Within the accreditation scopes marked with \*, the testing laboratory is permitted to freely select standardised or equivalent test methods without having to inform and obtain prior approval from DAkkS. The test methods listed are examples.

Within the accreditation scopes marked with \*\*\*, the testing laboratory is permitted to use the standardised or equivalent test methods listed here with different issue statuses without the need for prior information and approval by DAkkS.

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**1 Determination of the hardness of metallic materials and plastics using hardness testing methods \*(IBL-M, Ottobrunn)**

<b>Test area</b>	Hardness testing on plastics and metallic materials	
<b>Test area</b>	<b>Test type</b>	
	IRHD	
	Shore A	
	Shore D	
	Brinell	
	Vickers	
	Rockwell	
	<b>Test object</b>	
	Metallographic sections, samples, component-like samples, parts, components, structures and complete products made of metals, polymers and composite materials	
	<b>Test parameters</b>	
	Power	IRHD: 0.1533 N
		Shore A: 8.065 N
		Shore D: 44.5 N
Vickers: 9.81 - 294.3 N		
Brinell: 153.28 - 2452.5 N		
Penetration depth	HRC: 1471.5 N	
	IRHD 0.001 - 0.3 mm	
	HRC 60 - 120 mm	

**1.1 Characteristic test methods belonging to the test types listed above**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN ISO 6506-1 2015-02	Metallic materials - Brinell hardness test - Part 1: Test procedure	
ASTM E 10 2018	Testing of metallic materials - Brinell hardness test	

## List of test methods

### Accreditation Number D-PL-12001-02

DIN EN ISO 6507-1 2018-07	Metallic materials - Vickers hardness test - Part 1: Test procedure	
ASTM E 384 2017	Standard Test Method for Microindentation Hardness of Materials	Standard withdrawn
DIN EN ISO 6508-1 2016-12	Metallic materials - Rockwell hardness test - Part 1: Test procedure (here: scale C)	
ASTM E 18 2010	Standard Test Methods for Rockwell Hardness of Metallic Materials	Standard withdrawn
ASTM E 18 2020	Standard Test Methods for Rockwell Hardness of Metallic Materials	Standard withdrawn
DIN EN ISO 2639 2003-04	Steel - Determination and testing of case hardening depth	Replaced by DIN EN ISO 18203
DIN EN ISO 3887 2018-05	Steel - Determination of the decarburisation depth (here: <i>Chapter 5.3 - Method for measuring microhardness</i> )	
DIN EN 10328 2005-04	Iron and steel - Determination of the hardening depth after surface hardening	Replaced by DIN EN ISO 18203
DIN EN ISO 9015-1 2011-05	Destructive testing of welded joints on metallic materials - Hardness test - Part 1: Hardness test for arc welded joints	
DIN EN ISO 9015-2 2016-10	Destructive testing of welded joints in metallic materials - Hardness testing - Part 2: Microhardness testing of welded joints	
DIN 50190-3 1979-03	Hardening depth of heat-treated parts - Determining the nitriding hardness depth	Replaced by DIN EN ISO 18203
DIN 50190-4 1999-09	Laser technology - Hardening depth of heat-treated parts - Part 4: Determination of the melt hardness depth and the melt depth	cancelled without replacement
DIN ISO 48-2 2016-09	Elastomers and thermoplastic elastomers - Determination of hardness (hardness between 10 IRHD and 100 IRHD)	Standard withdrawn

**List of test methods**  
**Accreditation Number D-PL-12001-02**

DIN EN ISO 18203 2022-07	Steel -Determination of the thickness of hardened surface layers	Replaces DIN ISO 2639, DIN EN 10328, DIN 50190-03 17.01.2023
-----------------------------	--	---

**2 Metallographic testing methods (IBL-M, Ottobrunn)**

**2.1 Determination of non-metallic inclusions (steel purity) in steels using optical microscopy \***

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN 50602 1985-09	Metallographic testing methods; microscopic testing of stainless steels for non-metallic inclusions with image series	Replaced by DIN EN ISO 10247
DIN EN 10247 2017-09	Metallographic testing of the content of non-metallic inclusions in steels with image series	
ASTM E 45 2013	Guidelines for the quantitative determination of non-metallic inclusions in steel	Standard withdrawn
ASTM E 45 2018	Guidelines for the quantitative determination of non-metallic inclusions in steel	Standard withdrawn

**2.2 Determination of the recognizable ferrite or austenite grain size of steels (determination of the average grain size) using microphotographic methods \***

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN ISO 643 2013-05	Steel - Microphotographic determination of the apparent grain size	Standard withdrawn
DIN EN ISO 643 2020-06	Steel - Microphotographic determination of the apparent grain size	
ASTM E 112 2013	Determination of the average grain size	

**2.3 Other metallographic test methods \*\*\***

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN ISO 3887 2018-05	Steel - Determination of decarburisation depth (here: <i>Chapter 5.2 - Metallographic processes</i> )	
DIN EN ISO 945-1 2010-09	Microstructure of cast iron - Part 1: Graphite classification by visual evaluation	Norm withdrawn

**List of test methods**  
**Accreditation Number D-PL-12001-02**

DIN EN ISO 945-1 2019-10	Microstructure of cast iron - Part 1: Graphite classification by visual evaluation	
DIN EN ISO 1463 2004-08	Metal and oxide coatings - Coating thickness measurement - Microscopic procedure	Norm withdrawn
SEP 1520 1998-09	Microscopic examination of carbide formation in steels with image series	
SEP 1615 1975-01	Microscopic and macroscopic testing of high-speed steels for their carbide distribution with image series	

**3 Adhesion behavior of coatings (IBL-M, Ottobrunn)**

**3.1 Evaluation of the degree of blistering of coatings on steel by comparison with images \*\*\***

Standard	Designation	Remark
DIN EN ISO 4628-2 2016-07	Coating materials - Assessment of coating damage - Evaluation of the amount and size of damage and the intensity of uniform changes in appearance Part 2: Assessment of the degree of bubbles	

**3.2 Evaluation of the degree of rusting of coatings on steel by comparison with images \***

Standard	Designation	Remark
DIN EN ISO 4628-3 2016-07	Coating materials - Assessment of coating damage - Assessment of the amount and size of damage and the intensity of uniform changes in appearance Part 3: Assessment of the degree of rust	
ASTM D 610 2008	Testing coated steel surfaces for corrosiveness	Standard withdrawn

**3.3 Further tests on the adhesion behaviour of coatings \*\*\***

Standard	Designation	Remark
DIN EN ISO 2409 2013-06	Coating materials - Cross-cut test	Norm withdrawn
DIN EN ISO 2409 2020-12	Coating materials - Cross-cut test	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

ASTM D 3359 2017	Measurement of adhesion using the adhesive tape method	Norm withdrawn
---------------------	--	-------------------

**4 Surface testing of components using the replica technique \***  
**(IBL-M, Ottobrunn)**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN 54150 1977-08	Non-destructive testing - impression method for surface testing (replica technique) <i>(withdrawn standard)</i>	
ISO 3057 1998-03	Non-destructive testing - Metallographic replica technology for surface testing	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**5 Mechanical-technological tests \* (IBL-B, Ottobrunn)**

<b>Test area</b>	Mechanical-technological tests and fatigue strength tests without / with environmental stresses	
<b>Test area</b>	<b>Test type</b>	
	Static testing (force-, displacement- and strain-controlled) with temperature and/or media exposure	
	Quasi-static testing (force-, displacement- and strain-controlled) with temperature and/or media exposure	
	Single and multi-stage fatigue strength tests (force-, displacement- and strain-controlled) with temperature and/or media exposure	
	Vibration resistance tests in the operating load follow-up test with temperature and/or media effect	
	Thermomechanically controlled fatigue strength tests	
	<b>Test object</b>	
	Samples and components from the industrial, automotive, aviation, rail and wind power sectors	
	<b>Test parameters</b>	
	Frequency	0 ... 150 Hz
	Path	0.01 ... 5,000 mm
	Elongation	0,05 ... 50 %
	Power	0.1 ... 1,000 kN
	Moment	0.1 ... 4,000 Nm
Test temperature	-196 ... +1.200 °C	
Relative humidity	0 ... 100 %	

**5.1 Characteristic test methods belonging to the test types listed above**

**5.1.1 Determination of the quasi-static properties of metallic materials, plastics and plastic composites at different temperatures by means of tensile, compression and shear tests**

Standard	Designation	Remark
DIN EN ISO 6892-1 2017-02	Metallic materials - Tensile test - Part 1: Test method at room temperature (here: <i>Method B</i> )	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

DIN EN ISO 6892-1 2020-06	Metallic materials - Tensile test - Part 1: Test method at room temperature (here: Method B)	
DIN EN ISO 6892-2 2011-05	Metallic materials - Tensile test - Part 2: Test method at elevated temperature	
DIN EN ISO 6892-2 2018-09	Metallic materials - Tensile test - Part 2: Test method at elevated temperature	
DIN EN ISO 6892-3 2015-07	Metallic materials - Tensile test - Part 3: Test methods at low temperatures	
ASTM D 3518 2013	Testing the shear stress - slip in unidirectional reinforced plastics	
ASTM D 3518 2018	Testing the shear stress - slip in unidirectional reinforced plastics	
ASTM D 3039 2014	Standard test method for tensile properties of polymer matrix composite materials	
ASTM D 3039 2017	Standard test method for tensile properties of polymer matrix composite materials	
BS EN IEC 61462 2023	Composite hollow insulators. Pressurised and unpressurised insulators for use in electrical equipment with AC rated voltage greater than 1000 V AC and D.C. voltage greater than 1500V. Definitions, test methods, acceptance criteria and design recommendations (here: <i>Section 8 - Type Tests, Section 9 - Sample Tests, Section 10 - Routine Tests</i> )	Newly included

**5.1.2 Determination of material characteristics under oscillating stress of metallic materials and components by means of fatigue tests**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN 50100 2016-12	Fatigue strength test - Performance and evaluation of cyclic tests with constant load amplitude for metallic material samples and components	
DIN 50100 2022-12	Fatigue strength test - Performance and evaluation of cyclic tests with constant load amplitude for metallic material samples and components	Newly included



**List of test methods**  
**Accreditation Number D-PL-12001-02**

ASTM E 466 2015	Method for performing force-controlled, axial fatigue tests with constant amplitude on metallic materials
ASTM E 466 2021	Method for performing force-controlled, axial fatigue tests with constant amplitude on metallic materials

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**6 Determination of the vibration and earthquake resistance of plants and systems in the fields of energy, automotive, aviation, rail and medical technology by means of vibration tests \* (IBL-B, Ottobrunn)**

<b>Test area</b>	Vibration test and earthquake simulation without / with climatic conditions	
<b>Test area</b>	<b>Test type</b>	
	Sinus sweep (sliding sine)	
	Sine Beat	
	Continuous sine wave (fixed frequency)	
	Broadband noise	
	Synthetic design and safety earthquakes; real-time earthquake histories	
	APC Plane crash	
	Windmilling: FBO Fan Blade Out SEI Sustained Engine Imbalance LGTB Landing Gear Tyre Burst	
	Operating load follow-up test	
	<b>Test object</b>	
	Components, subsystems and systems from the energy technology, automotive, industrial, aviation, rail and medical technology sectors	
	<b>Test parameters</b>	
	Frequency	0.5 ... 200 Hz
	Acceleration	0 ... 350 m/s <sup>2</sup>
	Max. Deflection	400 mm
Max. Speed	3 m/s	
Degrees of freedom up to	3 translatory, 3 rotatory, simultaneous	
Max. Test specimen mass	13,000 kg	
Test temperature	-45 ... +95 °C	
Max. relative humidity	95%	
Max. Heating/cooling rate	3 K/min	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**6.1 Characteristic test methods belonging to the test types listed above**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
IEEE 693 2005	Recommended Practice for Seismic Design of Substations	
IEEE 693 2018	Recommended Practice for Seismic Design of Substations	
ANSI/IEEE 344 2004	Recommended Practice for Seismic Qualification for Class 1E Equipment for Nuclear Power Generating Stations	
ANSI/IEEE 344 2013	Recommended Practice for Seismic Qualification for Class 1E Equipment for Nuclear Power Generating Stations	
ANSI/IEEE 382 2006	Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations	
ANSI/IEEE 382 2019-11	IEEE Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations and Other Nuclear Facilities	
IEEE 535 2013	IEEE Standard for Qualification of Class 1E Vented Lead Acid Storage Batteries for Nuclear Power Generating Stations (in conjunction with amendment: IEEE Std 535™-2013/Cor 1-2017)	
KTA 2201.4 1990-06	Design of nuclear power plants against seismic events; Part 4: Requirements for methods to verify the seismic safety of mechanical and electronic plant components	
KTA 2201.4 2012-11	Design of nuclear power plants against seismic impacts - Part 4: System components	
KTA 3504 2015-11	Electrical drives of the safety system in nuclear power plants	
KTA 3505 2015-11	Type testing of transducers and transmitters in safety instrumentation and control technology	
DIN EN 60068-2-6 2008-10	Environmental influences - Part 2-6: Test methods - Test Fc: Oscillation (sinusoidal)	
IEC 60068-2-6 2007-12	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	

## List of test methods

### Accreditation Number D-PL-12001-02

DIN EN 60068-2-27 2010-02	Environmental influences - Part 2-27: Test methods Exam Ea and guide: Shock	
IEC 60068-2-27 2008	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	New included
DIN EN 60068-2-57 2000-07	Environmental audits Part 2: Tests - Test Ff: Oscillation - Time history method	
DIN EN 60068-2-57 2015-10	Environmental influences - Part 2-57: Tests - Test Ff: Oscillation - Time history method and sine pulses	
IEC 60068-2-57 2013-04	Environmental testing - Part 2-57: Tests - Test Ff: Vibration - Time-history and sine-beat method	
DIN EN 60068-2-64 2009-04	Environmental influences - Part 2-64: Test methods - Test Fh: Vibration, broadband noise (digitally controlled) and guide	
DIN EN 60068-2-64 2020-09	Environmental influences - Part 2-64: Test methods - Test Fh: Vibration, broadband noise (digitally controlled) and guide	
IEC 60068-2-64 2008	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance (in conjunction with amendment: IEC 60068-2-64-AMD 1 2019-10)	
DIN EN 60068-2-81 2004	Environmental testing - Part 2-81: Tests - Test Ei: Shock - Shock response spectrum synthesis	Newly included
IEC 60068-2-81 2003	Environmental testing - Part 2-81: Tests - Test Ei: Shock - Shock response spectrum synthesis	Newly included
IEC 60068-3-3 1991	Environmental testing Seismic test methods for devices Guide	Newly included
DIN IEC 60068-3-3 1993	Environmental testing Seismic test methods for devices Guide	
DIN EN IEC 60068- 3-3 2022-12	Environmental exposure - Part 3-3: Supporting documentation and guidance - Seismic test methods for equipment	

## List of test methods

### Accreditation Number D-PL-12001-02

IEC 60068-3-3 2019-08	Environmental testing - Part 3-3: Supporting documentation and guidance - Seismic test methods for Equipment; (in conjunction with amendment: IEC 60068-3-3 2019-COR1-2021-09)
DIN EN 60068-3-8 2004-09	Environmental testing - Part 38: Supporting documentation and guidance - Choice between different vibration test methods
IEC 60068-3-8 2003-08	Environmental testing - Part 3-8: Supporting documentation and guidance - Selecting among vibration tests
IEC 60076-11 2018-08	Power transformers - Part 11: Dry-type transformers
DIN EN 300019-2-3 2016-07	Apparatus design - Environmental conditions and environmental testing for telecommunications equipment - Part 2-3: Specifications for environmental testing - Stationary use, weatherproof
DIN EN 300019-2-3 2021-05	Device development - Environmental conditions and environmental tests for telecommunications equipment - Part 2-3: Specifications for environmental testing Stationary use, weather-protected (Restriction: <i>only vibration and seismic testing</i> )
ETSI EN 300019-2-3 V2.5.1 2020-10	Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-3: Specification of environmental tests; Stationary use at weatherprotected locations (Restriction: <i>only vibration and seismic testing</i> )
DIN EN 300019-2-4 2016-07	Apparatus design - Environmental conditions and environmental testing for telecommunications equipment - Part 2-4: Specifications for environmental testing - Fixed, non-weatherproof use
DIN EN 300019-2-4 2018-12	Device development (EE) - Environmental conditions and environmental tests for telecommunication systems - Part 24: Specifications for environmental testing - Stationary use, not weatherproof (Restriction: <i>only vibration and seismic testing</i> )

## List of test methods

### Accreditation Number D-PL-12001-02

ETSI EN 300019-2-4 V2.4.1 2015-12	Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-4: Specification of environmental tests; Stationary use at non-weatherprotected locations (Restriction: <i>only vibration and seismic testing</i> )
ETSI EN 300019-2-4 V2.5.1 2018-07	Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-4: Specification of environmental tests; Stationary use at non-weatherprotected locations (Restriction: <i>only vibration and seismic testing</i> )
DIN EN 60255-21-3 1995-11	Electrical relays - Part 21: Vibration, shock, continuous shock and earthquake tests on dimensioned relays and protective devices - Section 3: Earthquake tests
IEC 60255-21-3 1993-09	Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 3: Seismic tests
DIN EN IEC 60721-3-3 2020-05	Classification of environmental conditions - Part 3-3: Classes of influencing variables and their limit values - Stationary use, weather-protected (Restriction: <i>only vibration and seismic testing</i> )
IEC 60980 1989-06	Recommended practices for seismic qualification of electrical equipment of the safety system for nuclear generating stations
IEC/IEEE 60980-344 2020-10	Nuclear facilities - Equipment important to safety - Seismic qualification
DIN EN 61373 2011-04	Railway applications - Operating equipment of railway vehicles - Tests for vibrations and shocks (in conjunction with corrigendum: DIN EN 61373 corrigendum 2018-01)
IEC 61373 2010-05	Railway applications - Rolling stock equipment - Shock and vibration tests; (Corrigendum 1 already incorporated: IEC 61373 Corrigendum 1 2011-10)
DIN EN 61587-2 2001-09	Mechanical construction methods for electronic equipment - Tests for IEC 60917 and IEC 60297 Part 2: Seismic tests for cabinets and racks

## List of test methods

### Accreditation Number D-PL-12001-02

DIN EN 61587-2 2012-06	Mechanical construction methods for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 2: Seismic tests for cabinets and racks	
IEC 61587-2 2011-08	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 2: Seismic tests for cabinets and racks	
DIN EN 62271-207 2013-02	High-voltage switchgear and controlgear - Part 207: Earthquake qualification for gas-insulated switchgear and controlgear assemblies with rated voltages above 52 kV	
IEC 62271-207 2012	High-voltage switchgear and controlgear - Part 207: Seismic qualification for gas-insulated switchgear assemblies for rated voltages above 52 kV	
IEC 62271-207 2023	High-voltage switchgear and controlgear - Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal enclosed and solid-insulation enclosed switchgear for rated voltages above 1 kV	New included
DIN EN 1998-1 2010-12	Eurocode 8: Design of structures for earthquake resistance - Part 1: Fundamentals, seismic actions and rules for buildings	
GR-63-CORE NEBS 2012-04	Network Equipment-Building System Requirements: Physical Protection	
GR-63-CORE NEBS 2017-12	Network Equipment-Building System Requirements: Physical Protection	
IEC TS 62271-210 2013	High-voltage switchgear and controlgear - Part 210: Seismic qualification for metal enclosed and solid-insulation enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV	
ICC-ES AC156 2010-10	Acceptance criteria for seismic certification by shake-table testing of nonstructural components	
ICC-ES AC156 2015-05	Acceptance criteria for seismic certification by shake-table testing of nonstructural components	
ICC-ES AC156 2020-12	Acceptance criteria for seismic certification by shake-table testing of nonstructural components	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

RCC-E 2012	Design and construction rules for Electrical Equipment of Nuclear Islands	
RCC-E 2016	Design and construction rules for electrical equipment of PWR nuclear islands (Restriction: <i>only seismic vibration tests</i> )	
RCC-E 2019	Design and construction rules for Electrical and I&C Systems and Equipment (Restriction: <i>only seismic vibration tests</i> )	
IEC/TR 62271-300 2006	High-voltage switchgear and controlgear - Part 300: Seismic qualification of alternating current circuit-breakers (Restriction: <i>only seismic vibration tests</i> )	
IEC/IEEE 60780-323 2016-04	IEC/IEEE International Standard - Nuclear facilities - Electrical equipment important to safety - Qualification	
STANAG 4370 2014-09	ENVIRONMENTAL TESTING AECTP-400: Mechanical environmental tests - Method 401: Vibration (Restriction: <i>only seismic vibration tests</i> )	Withdrawn document



**List of test methods**  
**Accreditation Number D-PL-12001-02**

**7 Climatic tests \*\*\* (IBL-U, Ottobrunn)**

Standard	Designation	Remark
DIN EN 60068-2-1 2008-01	Environmental influences - Part 2-1: Test methods Test A: Cold	
DIN EN 60068-2-2 2008-05	Environmental influences - Part 2-2: Test methods Test B: Dry heat	
DIN EN 60068-2-14 2010-04	Environmental influences - Part 2-14: Test methods Test N: Temperature change (here: <i>Na and Nb test</i> )	
DIN EN 60068-2-30 2006-06	Environmental influences - Part 2-30: Test methods Test Db: Moist heat, cyclical (12 + 12 hours)	
DIN EN 60068-2-38 2010-06	Environmental testing - Part 2-38: Test methods - Test Z/AD: Composite test, temperature/humidity, cyclic	
DIN EN 60068-2-38 2021-04	Environmental testing - Part 2-38: Test methods - Test Z/AD: Composite test, temperature/humidity, cyclic	
DIN EN 60068-2-38 2022-09	Environmental testing - Part 2-38: Test methods - Test Z/AD: Composite test, temperature/humidity, cyclic	
DIN EN 60068-2-78 2010-10	Environmental testing - Part 2-78: Testing - Test Cab: Moist heat, constant	
DIN EN 60068-2-78 2014-02	Environmental testing - Part 2-78: Testing - Test Cab: Moist heat, constant	
ISO 16750-4 2010-04	Electrical and electronic automotive equipment - Environmental conditions - Part 4: Climatic stresses	
RTCA DO-160 G 2010	Radio Technical Commission for Aeronautics Environmental Conditions and Test Procedure for Airborne Equipment (here: <i>Section 4.5.1 to 4.5.5 - Temperature and Attitude</i> <i>Section 5 - Temperature Variation</i> <i>Section 6 - Humidity</i> )	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**8 Non-destructive testing \*\*\* (IBL-S, Dresden)**

**8.1 Penetration test**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN ISO 3452-1 2014-09	Non-destructive testing - Penetrant testing - Part 1: General principles; (here: point 8 only)	
DIN EN ISO 3452-5 2009-04	Non-destructive testing - Penetrant testing - Part 5: Penetrant testing at temperatures above 50 °C	
DIN EN ISO 3452-6 2009-04	Non-destructive testing - Penetrant testing - Part 6: Penetrant testing at temperatures below 10 °C	
DIN EN 1371-1 2012-02	Founding - Penetrant testing - Part 1: Sand, gravity and low pressure die castings	
DIN EN 1371-2 2015-04	Founding - Indentation testing - Part 2: Investment castings	
DIN EN 10228-2 2016-10	Non-destructive testing of steel forgings - Part 2: Penetrant testing	

**8.2 Magnetic particle testing**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN ISO 9934-1 2017-03	Non-destructive testing - Magnetic particle testing - Part 1: General principles; (here: points 7 to 14 only)	
DIN EN 1369 2013-01	Foundry - 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 welded joints - Magnetic particle testing	

**8.3 Visual inspection**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN 13018 2016-06	Non-destructive testing - Visual inspection - General principles; (here: points 5 and 6 only)	
DIN EN ISO 17637 2017-04	Non-destructive testing of welded joints - Visual inspection of fusion-welded joints	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

**9 Mechanical strength and functional tests on components of railway vehicles**  
**\*\*\* (IBL-S, Dresden)**

<b>Test area</b>	Multi-component static and dynamic tests	
<b>Test area</b>	<b>Test type</b>	
	Static testing (force- and displacement-controlled) with temperature	
	Quasi-static testing (force- and displacement-controlled) with temperature	
	Single and multi-stage fatigue strength tests (force- and displacement-controlled) with temperature	
	Vibration resistance tests in the operating load follow-up test with temperature	
	<b>Test object</b>	
	Samples, component-like samples, parts, components, structures and complete products from the fields of energy technology, automotive, industry, aviation, rail and agricultural technology	
	<b>Test parameters</b>	
	Power	10 N to 4000 kN
	Torque	5 Nm to 50 kNm
	Path	10 µm to 2.4 m
	Angle	0.1° to 360°
	Elongation	10 µm/m to 10000 µm/m
	Air speed/ wind speed	1 m/s to 4 m/s 4 m/s to 25 m/s
Speed	1 to 4000 min <sup>-1</sup>	
Temperature	0°C to 150°C	

**9.1 Characteristic test methods belonging to the test types listed above**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
DIN EN 16019 2014-06	Railway applications - Automatic couplers - Performance requirements, specific interface geometry and test methods	
DIN EN 12663-1 2015-03	Railway applications - Strength requirements for railway vehicle bodies - Part 1: Locomotives and passenger rolling stock (and alternative method for freight wagons)	

**List of test methods**  
**Accreditation Number D-PL-12001-02**

DIN EN 13749 2011-06	Railway applications - Wheelsets and bogies - Specification method for strength requirements for bogie frames
DIN EN 13749 2021-05	Railway applications - Wheelsets and bogies - Specification method for strength requirements for bogie frames
UIC 510-3 1994-07	Freight wagons - Test bench tests on frames of bogie wagons with 2 and 3 wheelsets
UIC 515-4 1993-01	Railway vehicles for the transport of passengers - bogies - running gear, Strength tests on the frame of bogies
UIC 566 1990-01	Stress on passenger coach bodies and their attachments
UIC 615-4 2003-02	Traction units - bogies and running gear, Strength tests on bogie frame structures
APTA-PR-CS-S-034- 99 2006-06	Standard for the Design and Construction of Passenger Railroad Rolling Stock
DIN EN 12082 2017-12	Railway applications - Wheelset bearings - Performance testing
DIN EN 12082 2021-09	Railway applications - Wheelset bearings - Performance testing

**10 Mechanical strength and functional tests on components of railway vehicles  
and construction machinery (qualification tests)  
(IBL-S, Dresden)**

<b>Standard</b>	<b>Designation</b>	<b>Remark</b>
TAS5-PV-01 23.07.2021	Carrying out qualification tests on components in the railway and construction machinery sector	

## List of test methods

### Accreditation Number D-PL-12001-02

#### Abbreviations used:

AECTP	Allied Environmental Conditions and Test Publication
APTA	American Public Transportation Association
ANSI	American National Standards Institution
ASTM	American Society for Testing and Materials
DIN	German Institute for Standardisation e.V.
EN	European standard
GR	Generic Requirements
NEBS	Network Equipment Building Systems
ICC-ES AC	International Code Council Evaluation Service Acceptance Criteria
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organisation for Standardisation
KTA	Nuclear Technology Committee
RCC-E	Règles de conception et de construction des matériels des chaudières électronucléaires
RTCA	Radio Technical Commission for Aeronautics
SEP	Steel-iron test sheets from the Verein Deutscher Eisenhüttenleute
STANAG	Standardisation Agreement (Standardisation agreement of the NATO contracting states on the use of standardised procedures or similar equipment. The STANAG guidelines are issued by NATO Standardisation
TAS5-PV-xx	In-house procedure of the conformity assessment body
UIC	Union internationale des chemins de fer