

Test methods for coatings

Liquid coating materials

Determination of the electrical conductivity and resistance	DIN EN ISO 15091
Determination of pH value - Part 1: pH-electrodes with glass membrane	DIN EN ISO 19396
Determination of surface tension by the ring method (polymer dispersions and rubber latices (natural and synthetic))	DIN ISO 1409, DIN EN 14370
Determination of fineness of grind	DIN EN ISO 1524
Determination of flow time by use of flow cups	DIN EN ISO 2431
Determination of density - Part 1: Pycnometer method	DIN EN ISO 2811-1
Determination of viscosity using rotary viscometers - Part 1: Cone-and-plate viscometer operated at a high rate of shear	DIN EN ISO 2884-1, DIN EN ISO 3219, DIN 53019-1 to -3
Determination of non-volatile-matter content	DIN EN ISO 3251
Drying tests <ul style="list-style-type: none"> • Determination of through-dry state and through-dry time • Pressure test for stackability • Surface-drying test using ballotini • Test using a mechanical recorder • Modified Bandow-Wolff test • Print-free test 	DIN EN ISO 9117-1, DIN EN ISO 9117-2, DIN EN ISO 9117-3, DIN EN ISO 9117-4, DIN EN ISO 9117-5, DIN EN ISO 9117-6

Determination of layer thickness DIN EN ISO 2808

Measurement of coating thickness - Microscopical method	DIN EN ISO 1463,
Measurement of dry-film thickness using the wedge-cut method	DIN EN ISO 19399
Measurement of coating thickness - Magnetic method	DIN EN ISO 2178
Measurement of coating thickness - Amplitude-sensitive eddy-current method	DIN EN ISO 2360

Drying tests

Determination of through-dry state and through-dry time	DIN EN ISO 9117-1
Surface-drying test using ballotini	DIN EN ISO 9117-3
Test using a mechanical recorder	DIN EN ISO 9117-4
Modified Bandow-Wolff test	DIN EN ISO 9117-5

Mechanical properties

Bend test (cylindrical mandrel)	DIN EN ISO 1519
Cupping test	DIN EN ISO 1520
Pendulum damping test	DIN EN ISO 1522
Cross-cut test	DIN EN ISO 2409
Buchholz indentation test	DIN EN ISO 2815
Pull-off test for adhesion	DIN EN ISO 4624
Rapid-deformation (impact resistance) tests - Part 1: Falling-weight test, large-area indenter	DIN EN ISO 6272-1, ASTM D 2794
Bend test (conical mandrel)	DIN EN ISO 6860
Determination of film hardness by pencil test	DIN EN ISO 15184
Determination of stone-chip resistance of coatings - Part 1: Multi-impact testing	DIN EN ISO 20567-1
Falling ball test on paint coatings and similar coatings	DIN 53154
Determination of the resistance of coatings to pressure water-jetting	DIN EN ISO 16925

Optical properties

Colorimetry Uni- and effect-varnishes (multi-angle color measurements)	DIN EN ISO 11664-1 to -5, DIN 5033-1, -7, -8 and -9, DIN 6175-1 and -2
Determination of gloss value at 20°, 60° and 85°	DIN EN ISO 2813
Determination of haze on paint films at 20°	DIN EN ISO 13803
Waviness measurements (Orange Peel/DOI)	

Scratch and abrasion resistance

Determination of scratch resistance <ul style="list-style-type: none"> • Constant-loading method • Variable-loading method 	DIN EN ISO 1518-1 and -2
Determination of abrasion resistance (Taber-method) <ul style="list-style-type: none"> • Rotating friction wheel method with abrasive paper 	
Amtec-Kistler test	

Permeability tests

Determination of water-vapor transmission properties - Cup method	DIN EN ISO 7783
---	-----------------

Determination of resistance to liquids

Immersion in liquids other than water	DIN EN ISO 2812-1
Water immersion method	DIN EN ISO 2812-2
Method using an absorbent medium	DIN EN ISO 2812-3

Weathering tests

Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	DIN EN ISO 16474-2, DIN EN ISO 4892-2, DIN EN ISO 105-B02, SAE J 1960, SAE J 2527
Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps	DIN EN ISO 16474-3, DIN EN ISO 4892-3, DIN EN 1062-11, DIN EN 927-6
Natural weathering of coatings - Exposure and assessment <ul style="list-style-type: none"> • Sylt • Helgoland • Bremen • Brocken (Harz, Highland in Northern Germany) • "Alte Weser"-Lighthouse (North Sea) • North Sea coast 	DIN EN ISO 2810, DIN EN 927-3, DIN 55665

Resistance to humidity

Determination of resistance to humidity - Part 1: Condensation (single-sided exposure)	DIN EN ISO 6270-1
Determination of resistance to humidity - Part 2: Condensation (in-cabinet exposure with heated water reservoir)	DIN EN ISO 6270-2

Corrosion tests

Corrosion tests in artificial atmospheres - Salt spray tests <ul style="list-style-type: none"> • Neutral salt spray test (NSS) • Acetic acid salt spray test (AASS) • Copper accelerated acetic acid salt spray test (CASS) 	DIN EN ISO 9227, ASTM B 117
Determination of resistance to cyclic corrosion conditions - Part 1: Wet (salt fog)/dry/humid	DIN EN ISO 11997-1, ASTM G 85
Determination of the effect of heat	DIN EN ISO 3248
Environmental testing - Part 2-14: Tests - Test N: Change of temperature	DIN EN 60068-2-14
Determination of resistance to filiform corrosion	DIN EN ISO 4623-1 and -2, DIN EN 3665, SAE J 2635
Performance requirements for protective paint systems for offshore and related structures	ISO 20340

Material properties of coatings and plastics

Determination of the percentage volume of non-volatile matter, determination the density of non-cellular plastics	DIN EN ISO 3233-2, DIN EN ISO 1183-1
Determination of melting behavior (Differential scanning calorimetry DSC i.a.)	DIN EN 61074, DIN EN ISO 3146
Enthalpy of melting and crystallization, Enthalpy of reaction and degree of conversion, Specific heat capacity	ISO/DIS 11357-3 ISO 11357-5 ISO 11357-4
Glass transition temperature and glass transition step height	ISO 11357-2
Infrared spectroscopy	DIN EN 1767, DIN 51451
<ul style="list-style-type: none"> • Determination of dynamic mechanical properties, -General principles • Tensile vibration - Non-resonance method • Flexural vibration • Compressive vibration - Non-resonance method • with different temperature, time, frequency 	ISO 6721-1, -4, -5, -11, -12 ISO 11359-2

Surface tests

Determination of surface tension <ul style="list-style-type: none"> • of solids (contact angle) • of liquids (tensiometers) 	DIN EN 828, ISO 15989 DIN EN 14370, DIN ISO 1409, DIN 53914
Surface texture: Profile method, surface roughness characteristics of blast-cleaned steel substrates	DIN EN ISO 4288, DIN EN ISO 8503-1 to -4
X-ray fluorescence spectroscopy XRF	DIN EN ISO 3892
Chemical composition of conversion layers (element contents) SEM/EDX	
Failure analysis, Analysis of contaminants, Analysis of polymer surfaces, Heavy metal content determination, Light microscopy, Energy-dispersive X-ray spectroscopy SEM/EDX, X-ray fluorescence spectroscopy XRF, Fourier-transform infrared spectroscopy FTIR, XPS, ToF-SIMS	

Mechanical behavior

Instrumented indentation test for hardness and materials parameters	DIN EN ISO 14577-1, -2, -3, -4
Determination of tensile properties, for rubber and elastomers, for plastics	DIN 53504, DIN EN ISO 527-1, -2, -3
Determination of tear resistance, Trouser tear method	ISO 6383-1
Peel test	DIN EN 1372, DIN EN 1464
Shear test	DIN EN 1373
Determination of tensile lap-shear strength of bonded assemblies	DIN EN 1465

Electrochemical corrosion protection tests

Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens	DIN EN ISO 16773-1, -2, -3
Current-Density-Potential-measurement (polarization measurement)	DIN 50918
Determination of resistance to cathodic disbonding of coatings exposed to sea water	DIN EN ISO 15711 ASTM G8-96