DAkkS
Deutsche
Akkreditierungsstelle

Accreditation

The Deutsche Akkreditierungsstelle attests with this **Partial Accreditation Certificate** that the testing laboratory

PAConsult GmbH
Birkenau 3, 22087 Hamburg, Deutschland

meets the requirements according to DIN EN ISO/IEC 17025:2018 for the conformity assessment activities listed in the annex to this certificate. This includes additional existing legal and normative requirements for the testing laboratory, including those in relevant sectoral schemes, provided they are explicitly confirmed in the annex to this certificate.

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

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This partial accreditation certificate only applies in connection with the notice of 25.10.2023 with accreditation number D-PL-11130-01.
It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 15 pages.

Registration number of the partial accreditation certificate: **D-PL-11130-01-02**
It is a part of the accreditation certificate: D-PL-11130-01-00.

Berlin, 25.10.2023 — Ralf Egner, Head of Department

Translation issued: 17.12.2024 — Dr.-Ing. Tobias Poeste, Head of Technical Unit

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 (www.dakks.de).

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

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10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The Deutsche Akkreditierungsstelle GmbH (DAkkS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkkS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

Pursuant to Art. 11 section 2 of Regulation (EC) 765/2008, the accreditation certificate shall be recognised as equivalent by the national authorities within the scope of this Regulation as well as by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkkS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Deutsche Akkreditierungsstelle GmbH

Annex to the Partial Accreditation Certificate D-PL-11130-01-02 according to DIN EN ISO/IEC 17025:2018

Valid from: **25.10.2023**

Date of issue: 17.12.2024

This annex is a part of the accreditation certificate D-PL-11130-01-00.

Holder of partial accreditation certificate:

PAConsult GmbH
Birkenau 3, 22087 Hamburg, Deutschland

with the locations

Birkenau 3, 22087 Hamburg, Deutschland
Ulmenau 6-10 und 18-20, 22087 Hamburg, Deutschland
Ulmenau 18-20, 22087 Hamburg, Deutschland
Humboldtstraße 33, 22083 Hamburg, Deutschland
Kolpingstraße 14, 88416 Ochsenhausen, Deutschland
Quitzowstraße 47, 10559 Berlin, Deutschland
Im RHYTech 13, 8212 Neuhausen am Rheinfall, Schweiz

The testing laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The testing laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

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

Tests in the fields:

physical-technological tests, physical and physical-mechanical tests, climate-, shock-, impact- and vibrations-, IP-protection-, solar radiation and corrosion tests as well as in whose combination; environmental simulation tests at packages, construction units, enclosures, components and devices

The testing laboratory is permitted, without being required to inform or obtain prior approval from DAkkS, to freely select standardized or equivalent test methods within the defined test areas. The listed testing methods are exemplary. The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

The testing methods are marked with the following symbols for the sites at which they are performed:

BER = Berlin	CH = Schweiz	OCH = Ochsenhausen
HH1 = Hamburg - Birkenau	HH2 = Hamburg - Ulmenau	HH3 = Hamburg - Humboldtstr.

Packaging tests as well as type tests on construction units, enclosures, components and devices with flexible scope of accreditation by category I

Test	Measured variable / Test parameter	Exemplary test procedures	Facility
A Low frequency vibration tests with fixed amplitude	Frequency range	DIN EN ISO 2247 ASTM D 4169 ASTM D 999 ISTA 1A-1E	HH1 HH2 HH3 CH BER OCH
	Amplitude (peak to peak)		
B Vibration test Shock test	Force vector Displacement Amplitude Peak to Peak Frequency range Acceleration Frequency range	ASTM D 4169 ASTM D 7386 ASTM D 4728 DIN EN 60068-2-64 ISTA 2A-2C	HH1 HH2 HH3 CH BER OCH
		DIN EN 60068-2-1 DIN EN 60068-2-6 DIN EN 60068-2-27 DIN EN 60068-2-57 DIN EN 60068-2-64 DIN EN 61373 DNVGL-CG-0339 RTCA DO-160 MIL-STD-810	HH1 HH2 HH3 BER
		DIN EN 60068-2-1 DIN EN 60068-2-27 DIN EN 60068-2-64	CH

Test	Measured variable / Test parameter	Exemplary test procedures	Facility
C Constant acceleration test (centrifuge)	Acceleration	RTCA-DO 160 G ISO 2669	HH1
D Shock test Impact test Drop test	Free Fall	ASTM D 4169 ASTM D 7386 ASTM D 5276 ASTM D 6055 ASTM D 6179 DIN EN 22876 DIN EN 22248 (ISO 2248) DIN EN 28768 DIN EN ISO 4180 ISTA 3 A, B, E, F, H and K	HH1 HH2 HH3 CH OCH BER
		DIN EN 60068-2-32 MIL-STD-810 RTCA DO-160	HH1 HH2 HH3 CH BER
E Compression test Stacking test (constant load) Linear load increase	Test loading	ASTM D 4169 ASTM D 642 ASTM D 7386 ISTA 3 A, B, E, F, H and K	HH2 HH3 CH OCH BER
		DIN EN ISO 12048 DIN 55440-1 DIN EN ISO 2234 DIN EN ISO 4180	HH2 HH3 CH BER OCH
F Climate test	Working area humidity (temperature range)	ISTA Series ASTM D 4332 ASTM F 1980 ASTM F 2825 DIN EN ISO 2233	HH1 HH2 HH3 CH BER OCH
	Humidity range (humidity deviation)	DIN EN 60068-2-30 DIN EN 60068-2-78 DNVGL-CG-0339 RTCA-DO-160 MIL-STD-810	HH1 HH2 HH3 BER
		DIN EN 60068-2-30 DIN EN 60068-2-78	OCH

Test	Measured variable / Test parameter	Exemplary test procedures	Facility
G Temperature test	Temperature	ASTM D 4332 ASTM F 1980 DIN EN ISO 2233 ISTA 7D	HH1 HH2 HH3 CH BER OCH
	Average Heating/cooling velocity	DIN EN 60068-2-30 DIN EN 60068-2-78 DNVGL-CG-0339 RTCA-DO-160 MIL STD 810	HH1 HH2 HH3 CH BER
H Corrosion test (Salt spray test)	Temperature range Spray pressure Salt Solution	DIN EN ISO 9227 DIN EN 60068-2-11 DIN EN 60068-2-52	HH1 HH2 HH3 CH BER
I Atmospheric pressure	Atmospheric pressure	ASTM D 4169 ASTM D 6653 ASTM D 7386 ISTA 4AB	HH1 HH2 HH3 BER CH OCH
		RTCA-DO 160	HH2
		ASTM F 1140	OCH HH3
		ASTM D 4991	HH3 OCH
		ASTM D 3078	OCH
J Fluids Susceptibility	Visual inspection Spraying with liquids Temperature	MIL-STD-810 RTCA DO-160	HH1 HH2 HH3
K Needle-flame test	Temperature Time Inflammableness / Inflammability	GOST R IEC 60695-2-2 DIN EN 60695-11-5 GL Richtlinien 2012 Part VI-7-2	HH1 HH2
L Inclined plane Horizontal Impact	Velocity	ASTM D 4169 ASTM D 880 DIN EN ISO 2244 ISTA 3 A, B, E, F, H and K	HH2 HH3 CH BER OCH

Test	Measured variable / Test parameter	Exemplary test procedures	Facility
M Solar Radiation	Wavelenght	MIL-STD 810 G	HH2 HH3
	Radiation intensity		
	Air velocity		
	Temperature		
N Bubble Test (Leak Detection)	Air pressure	ASTM F 2096	CH OCH HH3
	Optical Leakage (bubble emission)		
O Tensile and Pressure test	Force/Distance	ASTM F 88 ASTM D 882 DIN EN 2746	HH3 BER OCH
		DIN EN 868-5 DIN EN ISO 527-3	OCH HH3
P Sand Test and Dust Test	Temperature	RTCA DO-160G Section 12.0 MIL-STD-810H Method 510.7	BER
	Humidity		
	Air velocity		
	Mass flow		

The test methods listed are characteristics of the description of the test report packaging tests:

DIN 55440-1 2019-10	Packaging test - Determination of compression resistance - Part 1: Test with constant conveyance speed
DIN EN 22248 1993-02	Packaging - complete, filled transport packages; vertical impact test by dropping
DIN EN 868-5 2019-03	Packaging for terminally sterilized medical devices - Part 5: Sealable pouches and reels of porous materials and plastic film construction - Requirements and test methods
DIN EN 22876 1993-02	Packaging; complete, filled transport packages; rolling test
DIN EN ISO 2234 2002-12	Packaging - Complete, filled transport packages and unit loads - Stacking tests using a static load
DIN EN ISO 2247 2002-12	Packaging - Complete, filled transport packages and unit loads - Vibration tests at fixed low frequency

DIN EN ISO 4180 2020-03	Packaging - Complete, filled transport packages - General rules for the compilation of performance test schedules
DIN EN 28768 1993-02	Packaging; complete, filled transport packages - toppling test
ASTM D 3078 2002 (Reapproved 2013)	Standard Test Method for Determination of Leaks in Flexible Packaging by Bubble Emission
ASTM D 4169 2016	Standard Practice for Performance Testing of shipping containers and systems
ASTM D 7386 2016	Standard Practice for Performance Testing of Packages for Single Parcel Delivery Systems
ASTM D 6055 1996 (Reapproved 2019)	Standard Test Methods for Mechanical Handling of Unitized Loads and Large Shipping Cases and Crates
ASTM D 6179 2007 (Reapproved 2014)	Standard Test Methods for Rough Handling of Unitized Loads and Large Shipping Cases and Crates
ASTM D 6653 / 6653 M 2013	Standard Test Methods for Determining the Effects of High Altitude on Packaging Systems by Vacuum Method
ASTM D 880 1992 (Reapproved 2015)	Standard Test Method for Impact Testing for Shipping Containers and Systems
ASTM D 4332 2014	Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing
ASTM D 4991 2007 (Reapproved 2015)	Standard Test Method for Leakage Testing of Empty Rigid Containers by Vacuum Method
ASTM D 5276 2019	Standard Test Method for Drop Test of Loaded Containers by Free Fall
ASTM D 642 2015	Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
ASTM D 4728 2017	Standard Test Method for Random Vibration Testing of Shipping Containers
ASTM D 999 2008 (Reapproved 2015)	Standard Test Methods for Vibration Testing of Shipping Containers

ASTM F 1980 2016	Standard Guide for Accelerated Aging of Sterile Barrier Systems for Medical Devices
ASTM F 2096 2011 (Reapproved 2019)	Standard Test Method for Detecting Gross Leaks in Packaging by Internal Pressurization (Bubble Test)
ASTM F 2825 2018	Standard Practice for Climatic Stressing of Packaging Systems for Single parcel Delivery
DIN EN ISO 12048 2001-04	Packaging - Complete, filled transport packages - Compression and stacking tests using a compression tester
DIN EN ISO 2233 2001-11	Packaging - Complete, filled transport packages and unit loads - Conditioning for testing
DIN EN ISO 2244 2002-12	Packaging - Complete, filled transport packages and unit loads - Horizontal impact tests
DIN EN 60721-3-2 2018-12	Classification of environmental conditions - Part 3-2: Classification of groups of environmental parameters and their severities - Transportation and Handling
ISTA 1A 2014	Packaged-Products 150 lb (68 kg) or Less
ISTA 1B 2014	Packaged-Products Over 150 lb (68 kg)
ISTA 1C 2014	Extended Testing for Packaged-Products 150 kg (68 kg) or Less
ISTA 1D 2014	Extended Testing for Packaged-Products over 150 kg (68 kg)
ISTA 1E 2014	Unitized Loads of Same Product
ISTA 1G 2014	Packaged-Products 150 lb (68 kg) or Less (Random Vibration)
ISTA 1H 2014	Packaged-Products Over 150 lb (68 kg) (Random Vibration)
ISTA 2A 2011	Packaged-Products 150 lb (68 kg) or Less

ISTA 2B 2011	Packaged-Products Over 150 lb (68 kg)
ISTA 2C 2011	Furniture Packages
ISTA 3A 2018	Packaged-Products for Parcel Delivery System Shipment 70 kg (150 lb) or Less
ISTA 3B 2017	Packaged-Products for Less Than Truckload (LTL) Shipment
ISTA 3E 2017	Similar Packaged-Products in Unitized Loads for Truckload Shipment
ISTA 3F 2017	Packaged-Products in Mixed Pallet Loads for Regional Shipment 100 lb (45 kg) or Less
ISTA 3H 2011	Products or Packaged-Products in Mechanically Handled Bulk Transport Containers
ISTA 3K 2011	Fast Moving Consumer Goods in the European Retail Supply Chain
ISTA 4AB 2009	Packaged Products for Shipment in Known Distribution Channels
ISTA 7D 2007	Temperature Test for Transport Packaging

The test methods listed are characteristic of the description of the test report model tests on components, housings, components and devices:

DIN EN ISO 527-3 2019-02	Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets
DIN EN 1789 2014-12	Medical vehicles and their equipment - Road ambulances (Abs. 6.4.1 und 6.4.2)
DIN EN 2746 1998-10	Aerospace series - Glass fibre reinforced plastics - Flexural test, three point bend method

DIN EN 50155 2008-03	Railway applications - Electronic equipment used on rolling stock Section 10.2.1 Visual test Section 10.2.3 Cold test Section 10.2.4 Test with dry heat Section 10.2.5 Test with humid heat, circular Section 10.2.9 Insulation test Section 10.2.11 Vibration-, Shock- and Impact test Section 10.2.14 Test of the storage at low temperature
DIN EN 60068-2-1 2008-01	Environmental testing - Part 2-1: Tests - Test A: Cold
DIN EN 60068-2-2 2008-05	Environmental testing - Part 2-2: Tests - Test B: Dry heat
DIN EN 60068-2-6 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 60068-2-14 2010-04	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
DIN EN 60068-2-27 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 60068-2-31 2009-04	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens
DIN EN 60068-2-32 1995-03	Basic environmental testing procedures - Part 2: Tests; test Ed: Free fall
DIN EN 60068-2-38 2010-06	Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test
DIN EN 60068-2-52 2018-08	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)
DIN EN 60068-2-55 2014-10	Environmental testing - Part 2-55: Tests - Test Ee and guidance - Loose cargo testing including bounce

DIN EN 60068-2-64 2009-04	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance
DIN EN 60068-2-66 1995-06	Environmental testing - Part 2: Test methods - Test Cx: Damp heat, steady state (unsaturated pressurized vapour)
DIN EN 60068-2-67 1996-07	Environmental testing - Part 2: 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
DIN EN 60068-2-78 2014-02	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
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 60512-11-1 1999-08	Electromechanical components for electronic equipment - Basic testing procedures and measuring methods - Part 11: Climatic tests; Section 1: Test 11a: Climatic sequence
DIN EN 60945 2003-07 + Corrigendum 1 2010- 01	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results (*here: Section 8.2 to 8.7*)
DIN EN 61373 2011-04 + Corrigendum 1 2018-01	Railway applications - Rolling stock equipment - Shock and vibration tests
DIN ISO 9022-3 2015-08	Optics and photonics - Environmental test methods - Part 3: Mechanical stress

DIN EN ISO 9227 2015-09	Corrosion tests in artificial atmospheres - Salt spray tests
DNVGL-CG-0339 2019-12	Environmental test specification forelectrical, electronic and programmableequipment and systems
MIL-STD 810 C 1981-04	Assessment of Foreign Aircraft to vibrations when shooting with onboard weapons - Test specification number 519.2 Vibration
MIL-STD 810 E 1989-07	Test methods for determining the effects of natural and induced environments on equipment used in military applications Section 501.4: High temperature Section 502.4: Low temperature Section 507.4: Humidity Section 514.4: Vibration I Section 514.5: Vibration II Section 516.5: Shock
MIL-STD 810 F 2008-10	Department of defence test method standard for environmental engineering consideration and laboratory tests Section 501.4: High temperature Section 502.4: Low temperature Section 507.4: Humidity Section 514.4: Vibration I Section 514.5: Vibration II Section 516.5: Shock
MIL-STD 810 G 2000-01	Environmental engineering considerations and laboratory tests Section 500.5: Low Pressure Section 501.5: High Temperature Section 502.5: Low Temperature Section 505.5: Solar Radiation Section 507.5: Humidity Section 514.5: Vibration II Section 514.6: Vibration Section 516.6: Shock
MIL-STD 810 H 2019-01	Environmental engineering considerations and laboratory tests Section 500.6: Low Pressure Section 501.7: High Temperature Section 502.7: Low Temperature Section 505.7: Solar Radiation Section 507.6: Humidity Section 514.7: Sand and Dust Section 514.8: Vibration Section 516.8: Shock

RTCA / DO 160 D 2004-06 RTCA / DO 160 E 2004-09 RTCA / DO 160 F 2007-06	Environmental condition and test procedures for airborne equipment Section 5.0: Section 6.0: Section 7.0: Section 8.0:	 Temperature Variation Humidity Operational shock and crash safety Vibration
RTCA / DO 160 G 2010-12	Section 4.0: Section 5.0: Section 6.0: Section 7.0: Section 8.0: Section 10.0: Section 11.0: Section 12: Section 14.0:	Temperature and Altitude Temperature Variation Hunidity Operational Shocks and Crash Safety Vibration Waterproofness Fluids Suscepitbility Sand and Dust Salt Spray
ISO 2669 1995-04	Environmental tests for aircraft equipment - Steady-state acceleration	
DIN EN 60695-2-2 1996-07	Fire hazard testing - Part 2: Test methods - Section 2: Needle-flame test	
DIN EN 60695-11-5 2005-11	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	
GL Duidelines 2012 Part VI-7-2	Classification and Construction - VI: Additional Rules and Guidelines - 7: Guidelines for the Performance of Type Tests - Item 11: Flammability	

Physical and physical-mechanical tests

ASTM D 882 2012	Standard Test Method for Tensile Properties of Thin Plastic Sheeting
ASTM F 88/F 88M 2015	Standard Test Method for Seal Strength of Flexible Barrier Materials
ASTM F 2096 2011 (Reapproved 2019)	Standard Test Method for Detecting Gross Leaks in Packaging by Internal Pressurization (Bubble Test)

ASTM F 1140/F 1140M 2013	Standard Test Methods for Internal Pressurization Failure Resistance of Unrestrained Packages
ASTM F 1886/F 1886M 2016	Standard Test Method for Determining Integrity of Seals for Flexible Packaging by Visual Inspection

Test methods with flexibility by Category III

ASTM F 3039 2015	Standard Test Method for Detecting Leaks in Nonporous Packaging or Flexible Barrier Materials by Dye Penetration
ISO 5636-5 2013-11	Paper and board - Determination of air permeance (medium range) - Part 5: Gurley Method

IP-Protection class test with flexible scope of accreditation by category I

Test	Measured variable / Test parameter	Exemplary test procedures	Facility
Water-proofness tests	Flow rate Pressure	RTCA DO 160E DIN EN 60529 DIN 40050-9	HH1 CH
	Flow rate (high pressure) max. pressure Diving depth		HH1
			HH1 CH
	Water temperature range		HH1

IP-protection with flexibility by category III

DIN 40050-9 1993-05	Road vehicles; degrees of protection (IP-code); protection against foreign objects; water and contact; electrical equipment
DIN EN 60068-2-68 1997-02	Environmental testing - Part 2: Tests; test L: Dust and sand
DIN EN 60529 2014-09	Degrees of protection provided by enclosures (IP Code)

Abbreviations used:

ASTM	American Society for Testing and Materials
DIN	German institute for standardization
DNVGL	Det Norske Veritas Germanischer Lloyd
EN	European Standard
GL	Germanischer Lloyd SE
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISTA	International Safe Transit Association
MIL-STD	Department of defence test method standard for environmental engineering consideration and laboratory tests
RTCA	Environmental condition and test procedures for airborne equipment