

TEST REPORT

IEC 62262

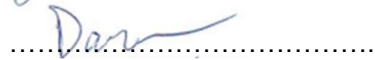
Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

Report reference No. : 2100711STO-202

Compiled by (+ signature)..... : Thomas Pettersson



Approved by (+ signature)..... : Daniel Pimenov



Date of issue..... : 11 February 2021

Contents : 11 pages

Testing laboratory

Name : Intertek Semko AB

Address : P.O. Box 1103, SE-164 22 Kista, Sweden

Testing location..... : as above

Test date.....: 10 – 11 February 2021

Client

Name : Eldon Installation AB

Address : Torshamnsgatan 43, SE-164 22 Kista, Sweden

Contact person : Andreas Hultinsson

Test specification

Standard : IEC 62262 First edition 2002-02

Specified IK-code : IK08, IK10

TRF date..... : 2019-11-20

Equipment Under Test (EUT)

Type of test object : ECO Homerun Charging Box

Trademark : Eldon Installation

Model and/or type reference : Drawing No. 04710104

Article No : -

Manufacturer : Eldon Installation AB

S/N : -

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Possible test case verdicts:

Test case does not apply to the test object : N/A (Not Applicable)

Test object does meet the requirement..... : P(Pass)

Test item does not meet the requirement..... : F(Fail)

Test case has not been checked : Not Checked

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the object tested.

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General description:

ECO Homerun Charging Box was tested for IK08 and IK10.

Empty enclosures:

the enclosure is tested without equipment inside, the manufacturer shall ensure that after the electrical equipment is enclosed the enclosure meets the declared degree of protection of the final product.

4	Designations											
	The degree of protection provided by an enclosure against impacts is indicated by the IK code in the following way:										-	
4.1	Arrangement of the IK code											
	IK: Codes letters (international mechanical protection)										P	
	Characteristic group numeral (00 to 10)										08 and 10	P
4.2	Characteristic group numerals of the IK code and their meanings											
	Each characteristic group numeral represents an impact energy value as shown in table 1.											
	Table 1 - Relation between IK code and impact energy											
IK code	IK00	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10	
Impact energy, J	*	0,14	0,2	0,35	0,5	0,7	1	2	5	10	<u>20</u>	
* Not protected according to this standard.												
NOTE 1 When higher impact energy is required, the value of 50 J is recommended.												
NOTE 2 A characteristic group numeral of two figures has been chosen to avoid confusion with some national standards which used a single numeral for a specific impact energy.												
4.3	Application of the IK code											
	In general, the degree of protection applies to the complete enclosure. If parts of the enclosure have differing degrees of protection, the latter shall be indicated separately.										P	
4.4	Marking											
	In cases where the relevant product committee decides that the marking of the IK-code shall be required, the marking requirements shall be detailed in the relevant product standard.										N/A	
	Where appropriate, such a standard should also specify the method of marking which is to be used when:										-	
	- one part of an enclosure has a different degree of protection to that of another part of the same enclosure,										N/A	

	- the mounting position has an influence on the degree of protection.		N/A
4.4	Marking		
	In cases where the relevant product committee decides that the marking of the IK-code shall be required, the marking requirements shall be detailed in the relevant product standard.		N/A
5	General requirements for tests		
5.1	Atmospheric conditions for tests		-
	Unless otherwise specified in the relevant product standard, the test shall be carried out under the standard atmospheric conditions for tests described in IEC 60068-1:		-
	- temperature range: 15°C to 35°C,		P
	air pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar).		P
	When the altitude at which the test is performed is higher than 2 000 m, the height of fall shall be adjusted where necessary to result in the specified impact energy.		N/A
5.2	Enclosures under test		
	Each enclosure under test shall be in a clean and new condition, complete with all its parts in place unless otherwise specified in the relevant product standard.		P
5.3	Specifications to be given in the relevant product standard		
	The relevant product standard shall specify:		-
	- the definition of "enclosure" as it applies to the equipment	Charging Box	P
	- the test equipment (e.g., pendulum hammer, spring hammer or vertical hammer, see clause 7);	Pendulum hammer used	P
	- the number of samples to be tested;	Two	P
	- the conditions for mounting, assembling, and positioning the samples, e.g., using an artificial surface (ceiling, floor, or wall), to simulate intended service conditions as far as possible	Wall mounted	P

	- the pre-conditioning, if any, which is to be used;		N/A
	- whether to be tested energised;		N/A
	- whether to be tested with any moving parts in motion;		N/A
	- the number of impacts and their points of application (see 6.4).	Five	P
	- In the absence of such specifications in the relevant product standard, the conditions of this standard shall apply.		N/A
6	Test to verify the protection against mechanical impacts		
6.1	The test specified in this standard is a type test.		-
6.2	protection against mechanical impacts, blows applied to the enclosure to be tested. The devices for this test are described in clause 7.		P
6.3	During the test, the enclosure shall be mounted on a rigid support, according to the manufacturer's instructions for use. A support is sufficiently rigid if its displacement is less than or equal to 0,1 mm under the effect of an impact directly applied and whose energy corresponds to the degree of protection. Alternative mounting and support, suitable for the product, may be specified in the relevant product standard.		P
6.4	The number of impacts shall be five on each exposed face unless otherwise specified in the relevant product standard. The impacts shall be evenly distributed on the faces of the enclosure(s) under test. In no case shall more than three impacts be applied in the surroundings of the same point of the enclosure. The relevant product standard shall specify the points of application of impacts.	Five impacts on five different places of the exposed surfaces. (front, above, under, left and right) IK08, 5J striking element and height of fall 300 mm. IK10, 20J striking element and height of fall 400 mm	P
6.5	Test evaluation		
	The relevant product standard shall specify the criteria upon which the acceptance or rejection of the enclosure is to be based, particularly:	No visual deformations or cracks.	P
	- admissible damages,		N/A
	- verification criteria relative to the continuity of the safety and reliability of the equipment.		N/A

7	Test apparatus		
	The test shall be done by using one of the test apparatus described in IEC 60068-2-75.	Pendulum hammer	P
	The relevant product standard shall specify which types of test apparatus are appropriate.		N/A

SUMMARY OF ENCAPSULATION TESTS ACCORDING TO IEC 62262

Conclusion of the IK08 and IK10 tests: PASS

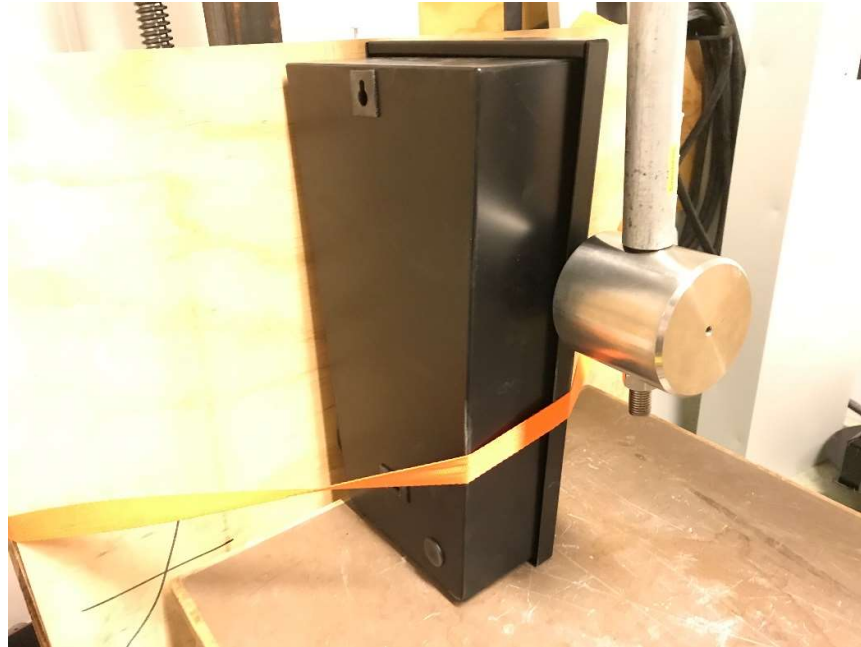
The result of the test fulfils the requirements in the standard IEC 62262 First edition 2002-02



Picture 1: 1 of 5 impact point on exposed surface (front).



Picture 2: 1 of 5 impact point on exposed surface (right).



Picture 3: 1 of 5 impact point on exposed surface (left).



Picture 4: 1 of 5 impact point on exposed surface (from above).



Picture 5: 1 of 5 impact point on exposed surface (from bottom side).

MAX OVERALL UNCERTAINTY**Statement concerning the measurement uncertainty and decision rules.**

Electrical quantities			Max overall uncertainty k=2
Voltage	≤ 1000V	DC	± 1,2%
	≤ 1000VRMS	45Hz - 5kHz	± 2,8%
Current	≤ 10A	DC	± 1,3%
	≤ 10A	45Hz - < 5kHz	± 1,6%
Resistance	< 100mΩ		± 1%
	100mΩ - 2MΩ		± 0,1%
	> 2MΩ		± 0,2%
Electric power	≤ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,3%
	≥ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,4%
Electric power (precision power meter)	≤ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,15%
Oscilloscopes	peak value		± 0,4%
Earth continuity meters	10A – 25A		± 0,6%
Leakage current	≤ 30mA	50 - 5000Hz	± 2,8%
Non-Electrical quantities			Max overall uncertainty k=2
Temperature	≤ 300°C		± 3°C
	Calculation of temp raise	> 300°C	± 4,5°C
Linear dimensions			
	Caliper	2 - 150mm	± 0,14mm
Micrometer	0 - 25mm	± 0,07mm	
Gauge rods	≤ 2mm		± 0,02mm
Mass	< 10g		± 0,5%
	10g - 100g		± 1%
	> 100g		± 2%
Relative humidity	10-95%RH		± 3%
Timers	1s - 1min		± 1s
	> 1min		± 1s
Corrosion testing, saltmist downfall	ml/h		± 0,15ml/h
Salt concentration	5g		± 0,1%
Ph value	6,5-7,2pH		± 0,002pH
Flow	l/min		± 5%
Pressure	Pa		± 5%
Acceleration	m/s ²		± 10%

Decision rule applied

Revision 2020-05-04.

“Simple Acceptance” rule, also called “Shared Risk Approach” of ILAC-G8:09/2019 guide.

The statements of conformity are reported as:

Passed – When the measured values are within the specified limits.

Failed – When one or more measures values are outside the specified limits.

TEST REPORT
IEC 60529

Degrees of protection provided by enclosures (IP Code)


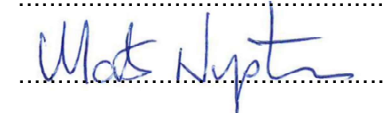
Report reference No. : 2101775STO-201

Compiled by (+ signature)..... : Håkan Mårtensson

Approved by (+ signature)..... : Mats Nyström

Date of issue..... : 08 April 2021

Contents : 10 Pages

Testing laboratory

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Test date..... : 17 -31 March 2021

Client

Name : Eldon Installation AB

Address : Petter Jönssons väg 1, SE- 571 34 Nässjö, Sweden

Contact person : Andreas Hultinsson

Test specification

Standard : IEC 60529: Edition 2.2, 2013-08

Specified IP-code : IP55

Equipment Under Test (EUT)

Type of test object : ECO Homerun Charging Box

Arrival date of EUT..... : 8 February 2021

Drawing No : 04710104

S/N : -

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General description:

According to IEC 60529: Edition 2.2, 2013-08. ECO Homerun charging box was tested to fulfil IP55.

Technical specification:

Dimensions: HxWxD 440x259x136 mm

Weight: 8 kg

Internal cable area: 6 mm

Phases: 1-phase or 3-phase

Installation network: TN-S

Voltage: 230 / 400V

Rated current: 32 A

Charging power Adjustable via dip switch from 8 A to 32 A

Corrosivity class C5

Communication Basic according to IEC 61851 or cloud based EpSpot

Charging socket Type 2 IEC 62196-2 with socket or fixed cable

Earth fault circuit breaker Type A with DC monitoring

Electricity meter M-bus

Complies with standards IEC 61851-1 (Electric vehicle conductive charging), IEC 61851-22 (AC charging station), IEC 61439-7 (AEVCS).

SUMMARY OF ENCAPSULATION TESTS ACCORDING TO IEC 60 529: 2013:

The IP5X test was conducted without pressure difference:

The IEC 61851-1:2017 does not require a pressure difference during the dust test IP5X. Since the IEC 61851-1:2017 is to be tested in conjunction with IEC 61439-7:2018 TS and IEC 61439-1:2020 assemblies with a degree of protection of IP5X shall be tested according to category 2 in 13.4 of IEC 60529:1989 and IEC 60529:1989/AMD1:1999.

Description of enclosures of category 2 according to IEC 60529:1989 and IEC 60529:1989/AMD1:1999:

Enclosures where no pressure difference relative to the surrounding air is present.

Conclusion of the IP55 test: Pass

The IP55 tests fulfils the requirements of the standard IEC 60529 Ed 2.2: (2013).

10	Marking		
	Marking		-
11	General requirement for tests.		
11.1	Tests should be carried out under the standard atmospheric conditions described in IEC 60068-1		P
11.2	Test samples shall be in a clean and new condition.		N/A
	The relevant product standard shall specify details such as: The number of samples to be tested;		N/A
	-conditions for mounting, assembling, and positioning of the samples;	As in normal use	P
	-the pre-conditioning, if any, which is to be used;		N/A
	-whether to be tested energized or not;	Not energized	P
	-whether to be tested with its parts in motion or not;		N/A
11.5	Empty enclosures		
	If the enclosure is tested without equipment inside, the manufacturer shall ensure that after the electrical equipment is enclosed the enclosure meets the declared degree of protection of the final product.		N/A
12	Tests for protection against access to hazardous parts indicated by the first characteristic numeral.		
	Test conditions for IP 0X:	No test required	N/A
	Test conditions for IP 1X: The sphere of 50 mm \varnothing	The access probe, sphere of 50 mm \varnothing , shall have adequate clearance from hazardous parts	N/A
	Test conditions for IP 2X: The jointed test finger may penetrate up to its 80 mm length, but adequate clearance shall be kept.	The jointed test finger of 12 mm \varnothing , 80 mm length, shall have adequate clearance from hazardous parts	N/A
	Test conditions for IP 3X: The test rod of 2.5 mm \varnothing shall not penetrate and adequate clearance shall be kept.	The probe of 2.5 mm \varnothing did not penetrate the EUT	N/A
	Test conditions for IP 4X: The test wire of 1.0 mm \varnothing shall not penetrate and adequate clearance shall be kept.	The probe of 1.0 mm \varnothing did not penetrate the EUT	N/A
	Test conditions for IP 5X:	The probe of 1.0 mm \varnothing did not penetrate the EUT	P
	Test conditions for IP 6X:	The probe of 1.0 mm \varnothing did not penetrate the EUT	N/A

13	Tests for protection against solid foreign objects indicated by the first characteristic numeral					
First, characteristic numeral	Test means (object probes and dust chamber)	Test force	Test conditions, see			
0	No test required	-	-		N/A	
1	Rigid sphere without handle or guard 50 ₀ ^{+0.05} mm diameter.	50 N ± 10%	13.2	The object probe, sphere of 50 mm Ø, shall not fully penetrate.	N/A	
2	Rigid sphere without or guard 12.5 ₀ ^{+0.2} mm diameter.	30 N ± 10%	13.2	The object probe, sphere of 12.5 mm Ø, shall not fully penetrate.	N/A	
3	Rigid steel rod 2.5 ₀ ^{+0.05} mm diameter with edges free from burrs.	3 N ± 10%	13.2	The test wire (Ø 2.5 mm) is pushed into places of possible penetration. Test force: 3 N.	N/A	
4	Rigid steel wire 1.0 ₀ ^{+0.05} mm diameter with edges free from burrs.	1N ± 10%	13.2	The test wire (Ø 1.0 mm) is pushed into places of possible penetration. Test force: 1 N.	P	
5	Dust chamber, with or without under pressure.	-	13.4+13.5	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety.	P	
6	Dust chamber, with under pressure.	-	13.4+13.6		N/A	
13.3	Acceptance conditions for the first characteristic numeral 1, 2, 3, 4. The protection is satisfactory if the full diameter of the probe does not pass through any opening.				N/A	
13.4	Category 1: Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air, for example, due to thermal cycling effects.				N/A	
	Category 2: Enclosures where no pressure difference relative to the surrounding air is present.				P	

<p>13.5.2</p>	<p>Acceptance conditions for the first characteristic numeral 5. The protection is satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location such that, as with any other kind of dust, it could interfere with the correct operation of the equipment or impair safety. Except for special cases to be clearly specified in the relevant product standard, no dust shall deposit where it could lead to tracking along the creepage distances.</p>	<p>No ingress of talcum powder.</p>	<p>P</p>
<p>13.6.2</p>	<p>Acceptance conditions for the first characteristic numeral 6. The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.</p>		<p>N/A</p>

14	Tests for protection against water indicated by the second characteristic numeral		
14.2.0	No test required.		N/A
14.2.1	Test for second characteristic numeral 1 with a drip box.	Drip box Enclosure on turntable 1 mm/min 10 min	N/A
14.2.2	Test for second characteristic numeral 2 with a drip box.	Drip box Enclosure in 4 fixed positions of 15° tilt 3 mm/min 2.5 min for each position of tilt	N/A
14.2.3	Test for second characteristic numeral 3 with an oscillating tube or spray nozzle.	Oscillating tube Ø 40 cm ± 60° from vertical Distance max. 200 mm Flow 0.56 l/min Duration 10 minutes	N/A
14.2.4	Test for second characteristic numeral 4 with oscillating tube or spray nozzle.	Oscillating tube Ø 80 cm ± 180° from vertical Distance max. 200 mm Flow 1,80 l/min Duration 10 minutes	N/A
14.2.5	Test for second characteristic numeral 5 with a 6.3-mm nozzle, tested with a spraying nozzle.	Water jet hose nozzle Ø 6.3 mm Water flow 12.5 L/min Duration: 3 min during rotation Distance 2.5 to 3 m	P
14.2.6	Test for second characteristic numeral 6 with a 12.5-mm nozzle	Water jet hose nozzle Nozzle 12,5 mm diameter Distance 2.5 m to 3 m 100 l/min, 1 min/m ² at least 3 min	N/A
14.2.7	Test for second characteristic numeral 7: Temporary immersion between 0.15 m and 1 m	Immersion tank Water-level on enclosure: 0.15 m above top 1 m above bottom Duration 30 min	N/A
14.2.8	Test for second characteristic numeral 8: Continuous immersion subject to agreement.	Immersion tank Water-level: by agreement – by agreement	N/A
14.2.9	Test for second characteristic numeral 9 by high pressure and temperature water jetting.		N/A
14.3	Acceptance conditions second characteristic numeral 5. The protection is satisfactory if any water has entered, it shall not be sufficient to interfere the correct operation or impair the safety of the equipment.	Small amount of water inside the EUT.	P
15.	Tests for protection against access to parts indicated by the additional letter.		N/A

Possible test case verdicts:

Test case does not apply to the test object : N/A (Not Applicable)

Test object does meet the requirement..... : P (Pass)

Test item does not meet the requirement..... : F (Fail)

Test case has not been checked : Not Checked

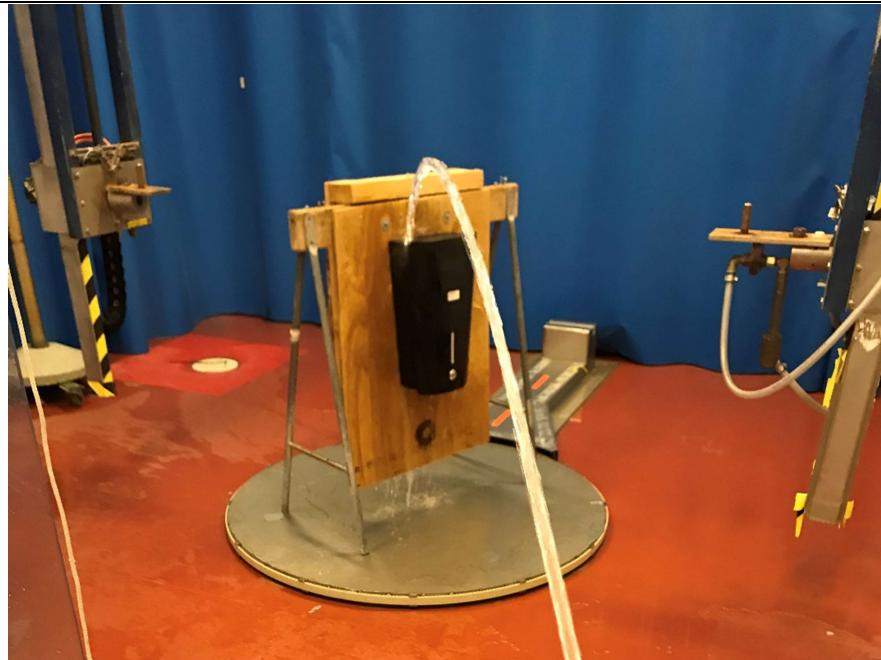
	Pictures	
		
	Picture 1, EUT.	
		
	Picture 2, Test wire Ø 1 mm IP5X test, the test wire did not penetrate the housing.	



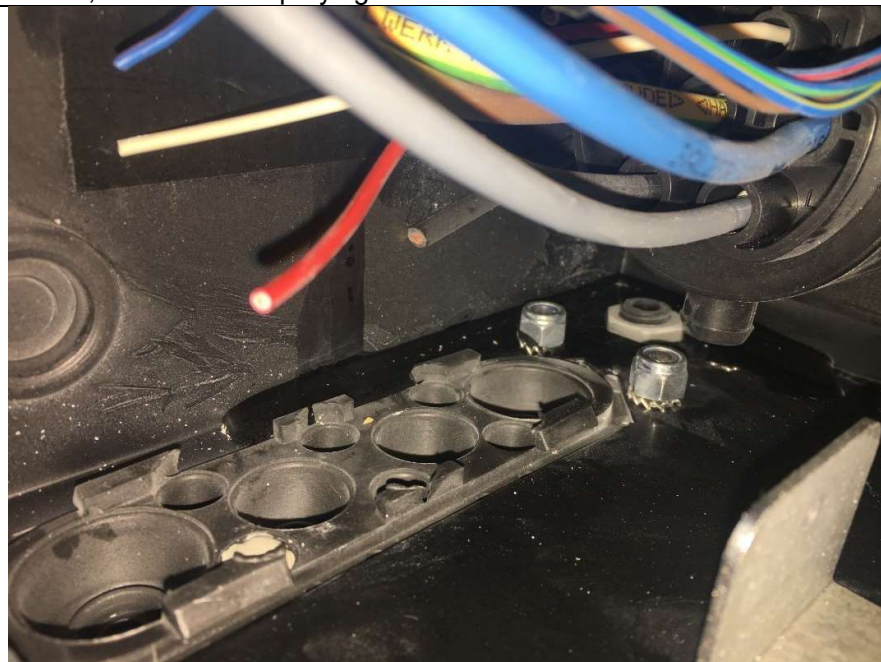
Picture 3 Dust chamber with no pressure difference.



Picture 4 No trace of dust after the dust test.



Picture 5, Test for second characteristic numeral 5 with a 6.3-mm nozzle, tested with a spraying nozzle.



Picture 6, After IPX5 Small amount of water inside the EUT.

MAX OVERALL UNCERTAINTY
Statement concerning the measurement uncertainty and decision rules.

Electrical quantities			Max overall uncertainty k=2
Voltage	≤ 1000V	DC	± 1,2%
	≤ 1000VRMS	45Hz - 5kHz	± 2,8%
Current	≤ 10A	DC	± 1,3%
	≤ 10A	45Hz - < 5kHz	± 1,6%
Resistance	< 100mΩ		± 1%
	100mΩ - 2MΩ		± 0,1%
	> 2MΩ		± 0,2%
Electric power	≤ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,3%
	≥ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,4%
Electric power (precision power meter)	≤ 3kW	45 Hz ≤ f ≤ 66 Hz	± 0,15%
Oscilloscopes	peak value		± 0,4%
Earth continuity meters	10A – 25A		± 0,6%
Leakage current	≤ 30mA	50 - 5000Hz	± 2,8%
Non-Electrical quantities			Max overall uncertainty k=2
Temperature Calculation of temp raise	≤ 300°C		± 3°C
	> 300°C		± 4,5°C
Linear dimensions Caliper Micrometer	2 - 150mm		± 0,14mm
	0 - 25mm		± 0,07mm
Gauge rods	≤ 2mm		± 0,02mm
Mass	< 10g		± 0,5%
	10g - 100g		± 1%
	> 100g		± 2%
Relative humidity	10-95%RH		± 3%
Timers	1s - 1min		± 1s
	> 1min		± 1s
Corrosion testing, saltmist downfall	ml/h		± 0,15ml/h
Salt concentration	5g		± 0,1%
Ph value	6,5-7,2pH		± 0,002pH
Flow	l/min		± 5%
Pressure	Pa		± 5%
Acceleration	m/s ²		± 10%

Decision rule applied

Revision 2020-05-04.

“Simple Acceptance” rule, also called “Shared Risk Approach” of ILAC-G8:09/2019 guide.

The statements of conformity are reported as:

Passed – When the measured values are within the specified limits.

Failed – When one or more measures values are outside the specified limits.