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TEST REPORT
IEC 62561-1
Lightning protection system components (LPSC)
Part 1: Requirements for connection components

Report Number.....:	P250203401
Date of issue.....:	2025-04-01
Total number of pages.....:	22
Testing Laboratory.....:	Guangdong LNP Electrical Testing Technology Co., Ltd.
Testing location/ address.....:	No. 101, Building B, Xinyongsheng Technology Park, Wenquan South Road No. 70, Xinwei Village, Shilong Town, Dongguan City, Guangdong Province, China.
Tested by (name + signature).....:	Francis Lau / Test Engineer
Approved by (name + signature)...:	Andy Chen / Project Director
Applicant's name.....:	Indelec SA
Address.....:	61, chemin des postes 59500 Douai - France
Test specification:	
Standard.....:	IEC 62561-1:2023
Test procedure.....:	Type test
Non-standard test method.....:	N/A
Test item description.....:	Light Duty Air Rod Saddle
Trade Mark.....:	Indelec
Manufacturer.....:	Indelec SA.
Model/Type reference.....:	LDS 16M
Classification.....:	Class H

Copy of marking plate

Description	Light Duty Air Rod Saddle
Model	LDS 16M
Trade Mark	Indelec

Test item particulars.....:	Light Duty Air Rod Saddle
According to the ability to withstand lighting current.....:	☒ class H for heavy duty; ☐ class N for normal duty
According to he installation location.....:	☒ outdoors; ☐ indoors; ☐ buried in ground; ☐ embedded in concrete; ☐ embedded in materials with thermal insulation
According to he mechanical behaviour of connection components.....:	☒ intended to withstand a static mechanical load; ☐ not intended to withstand a static mechanical load
According to whether or not a connection is permanent.....:	☐ permanent connection; ☒ non-permanent connection
Material.....:	Copper Alloy
Nominal cross-sectional area, dimension and shape. It is recommended that the actual cross-sectional area should also be given.....:	Diameter of Air terminal is 16mm; 25mm x 3mm Copper tape
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing.....:	
Date of receipt of test item..... :	2025-03-11
Date (s) of performance of tests.....:	2025-03-18 to 2025-04-01

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

General product information:

1. The tests were conducted on 6 samples as listed in table below:

Clause	Test items	Sample No.:
6.3	Marking test	LDS 16M-#1, LDS 16M-#2, LDS 16M-#3
6.5	Conditioning and ageing	
6.6	Electrical test	
6.7	Static mechanical withstand capability	LDS 16M-#4, LDS 16M-#5, LDS 16M-#6

2. Name and address of factory:
Indelec SA.
61, chemin des postes 59500 Douai - France

Clause	Requirement - Test	Result - Remark	Verdict
5	Requirements		--
5.1	General		--
	Connection components shall be designed in such a manner that, when they are installed in accordance with the manufacturer's instructions, their performance shall be reliable, stable and safe to persons and surrounding equipment.		P
	A summary of the requirements and their corresponding tests is given in Annex A.		P
5.2	Documentation and installation instructions		--
	The manufacturer of the connection component shall provide adequate instructions in their literature to ensure that the installer of the connection component can select and install the components in a suitable and safe manner, containing at least the following information:		P
	a) classification and lightning current capability (I imp);	100 kA	P
	b) classification according to the installation location;	15 Nm	P
	c) classification according to the mechanical behaviour;		P
	d) classification according to whether or not the connection is permanent;		P
	e) the range of conductor sizes and materials;	Diameter of Air terminal is 16mm; 25mm x 3mm Copper tape	P
	f) the connection configuration;	According to annex B.4	P
	g) assembly instructions for permanent or non-permanent connection components (e.g. whether special tools are necessary, tightening torque, etc.).		P
	Compliance is checked in accordance with 6.2.		P
5.3	Marking		--
5.3.1	Content of marking		--
	The connection components shall be marked at least with the following:	Class H	P
	a) the manufacturer's or responsible vendor's name or trademark;	Indelec	P
	b) identifying symbol (picture, product number, etc.);	LDS 16M	P
	c) classification, i.e. class N or H;	Class H	P
	d) classification according to the installation location.		P
	Compliance is checked by review in accordance with 6.3.1 , a).		P

Clause	Requirement - Test	Result - Remark	Verdict
	Where this proves to be impractical the marking in accordance with b), c) and d) may be given on the smallest packing unit label or on the accompanying documentation.		P
5.3.2	Durability and legibility		--
	The marking shall be durable and legible.		--
	Compliance is checked by test in accordance with 6.3.1 b).		P
5.4	Lightning current carrying capability		--
	Connection components shall have sufficient lightning current carrying capability.		P
	Compliance is checked in accordance with 6.6 following the manufacturer's declaration for the class (H or N) of the connection components in accordance with 4.1 .	Class H	P
5.5	Static mechanical withstand capability		--
	Connection components classified according to 4.3 a) shall have a sufficient withstand capability against static mechanical stresses.		
	Equipotential bonding bars and connections made by seaming are excluded from this requirement.		P
	Compliance is checked in accordance with 6.7.		P
5.6	Permanent connection		--
	Where exothermic process, brazing, welding, crimping or seaming are used for connection, the design shall be such that the conductor and the metal installation is always securely bonded.	Not permanent connection.	N/A
	Compliance is checked by inspection and in accordance with 6.6.2 a), b) and g).		N/A
5.7	Non-permanent connection		--
	Where screws or nuts are used as the clamping connection, the design shall be such that the conductor and the metal installation is always securely fastened by the screw or nut application.	Nuts are used as the clamping connection, with 15 Nm.	P
	Compliance is checked by inspection and in accordance with 6.6.2 a), b), d) and f).		P
	Compliance of connection components classified according to 4.2 d) is checked by inspection according to 6.6.2 a), d) and g).		P
5.8	Dismantling of test joints		--
	It shall be possible to dismantle the test joints after lightning current stress.		P
	Compliance is checked by inspection and in accordance with 6.6.2 a), b), d) and f).		P
5.9	Expansion piece		--

Clause	Requirement - Test	Result - Remark	Verdict
	In addition to the requirements of this document, the expansion piece (E of Figure 7) shall fulfil the requirements of IEC 62561 -2 for air termination conductors.		N/A
6	Tests		--
6.1	General condition on tests		--
	a) The tests in accordance with this document are type tests (see 3.1 3), performed in a sequence according to Annex C. Type tests are of such a nature that, after they have been made, unless changes are made to the accessory materials, design or type of manufacturing process which can change the performance characteristics, repeated testing is not required.		P
	b) Unless otherwise specified, tests are carried out with the specimens assembled and installed as in normal use according to the manufacturer's or supplier's installation instructions with the recommended conductor materials, sizes and tightening torques.	Recommended conductor: Diameter of Air terminal is 16mm; 25mm x 3mm Copper tape	P
	c) All tests are carried out on new specimens.		P
	d) Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met.	Three specimens	P
	e) If only one of the specimens does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding one which can influence the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.		P
	f) The electrical test shall be carried out in the order given, after conditioning and ageing of the arrangement of the specimen in accordance with 6.5.		P
	The applicant, when submitting the sets of specimens, can also submit an additional set of specimens which can be used, should one specimen fail. The laboratory will then, without further request, test the additional set of specimens and will reject it only if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.		P
	For components already tested according to IEC 62561 -1 :201 7, the reduced test procedure according to Annex E can be applied.		
	For new components complete type tests and samples according to Clause 6 are required.		
6.2	Documentation and installation instructions		--

Clause	Requirement - Test	Result - Remark	Verdict
6.2.1	General test conditions		--
	The content of the installation instructions is checked as per its completeness by review.		P
6.2.2	Acceptance criteria		--
	Documentation or installation instructions are deemed to be acceptable if they contain at least the information specified in 5.2.		P
6.3	Marking test		--
6.3.1	General test conditions		--
	The marking is checked:		--
	a) as per its completeness in accordance with 5.3.1 by review and		P
	b) as per its durability and legibility by rubbing it by hand for 1 5 s with a piece of cloth soaked with water and again for 1 5 s with a piece of cloth soaked with white spirit or mineral spirit.		N/A
	Marking made by moulding, pressing or engraving is not subjected to this test.	Marking made by moulding	P
6.3	Acceptance criteria		--
	The specimen is deemed to have passed the test if:		--
	a) the marking contains all the information of 5.3.1 ;		N/A
	b) after the test according to 6.3.1 , b) the marking remains durable and legible.		N/A
6.4	Preparation of the specimen		--
	a) If not otherwise specified by the manufacturer, the conductors and the specimens shall be cleaned by using a suitable degreasing agent followed by cleaning in demineralized water and drying. They shall then be assembled in accordance with the manufacturer's instructions, for example with the recommended conductors and tightening torques.		P
	b) The conductors and rods used for this test shall fulfil the requirements of IEC 62561 -2.		P
	c) The connection component shall be tested in all the connection configurations declared by the manufacturer. Typical connection configurations for various LPSC are illustrated in Annex B.		P
	d) If the connection component is suitable for various conductors' materials, then it shall be tested on each material combination declared by the manufacturer.		P

Clause	Requirement - Test	Result - Remark	Verdict
	e) Any connection components accommodating a range of conductors with a variation on any dimension equal to or less than 2 mm shall be tested using the minimum conductor size recommended. If the range of conductor sizes is greater than 2 mm, it shall be tested using the minimum and maximum size of conductors recommended.		P
	f) The basic arrangement of the specimen with cross-connection component, parallel connection component, bridging component and equipotential bonding bar is shown in Figure 1 , Figure 2, Figure 3 and Figure 4, respectively. Terminals of bonding bars are only tested if the connection size is equal to or greater than 1 6 mm^2 . The test is carried out using the smallest conductor size within the range of the terminal with a minimum of 16 mm^2 conductor. Typical arrangements for various LPSC are shown in Annex B.		P
	g) Prorated section of an installation to be embedded in concrete, including connection components such as connectors, clamps, crimping connections, shall be arranged as connections, shown in Figure 5 a) Figure 5 b), Figure 5 c), and shall be assembled according to the manufacturer's instructions.		P
	h) Prorated section of an installation to be embedded in concrete, including connection components such as brazed, welded, exothermically welded, etc., shall be arranged as shown in Figure 6 a), Figure 6 b), Figure 6 c) and shall be prepared according to the designer's or installer's instructions and supervision of the installer.		P
6.5	Conditioning and ageing		--
	Following the manufacturer's declaration in accordance with 4.2 but before the electrical tests of 6.6, the arrangement of the specimen shall be subjected to a conditioning and ageing treatment in accordance with Annex D.		P
	The manufacturer shall provide proof of the copper content of any part of the assembly made from an alloy having a copper content ≥ 80 %.		P
	After the treatment, the arrangement is fixed on an insulated plate, taking care to avoid any damage to the specimen during handling.		P
	This treatment is not necessary for connection components designed for installation locations:		P
	a) indoors;		N/A
	b) completely embedded in concrete.		N/A

<table>
<tr><th>Clause</th><th>Requirement - Test</th><th>Result - Remark</th><th>Verdict</th></tr>
<tr><td></td><td>Connection components designed to be partially embedded in concrete shall be subjected to the conditioning and ageing test in accordance with 6.5.</td><td></td><td>N/A</td></tr>
<tr><td>6.6</td><td>Electrical test</td><td></td><td>--</td></tr>
<tr><td>6.6.1</td><td>General test conditions</td><td></td><td>--</td></tr>
<tr><td></td><td>After 6.5 and without cleaning the arrangement, the specimen shall be stressed three times by a test current as given in Table 1 . The time interval between individual shots shall allow the arrangement of the specimen to cool down to approximately ambient temperature.</td><td></td><td>P</td></tr>
<tr><td></td><td>The impulse discharge current passing through the device under test is defined by the current peak value I imp , and the specific energy W/R. The impulse current shall show no reversal and reach I imp within 50 μs. The transfer of the specific energy W/R shall be dissipated within 5 ms.
Table 1 – Lightning impulse current (I_{imp}) parameters
<table>
<tr><th>Classification</th><th>I_{imp}
kA
±10 %</th><th>W/R
kJ/Ω
$^{+45}_{-10}$ %</th></tr>
<tr><td>H</td><td>100</td><td>2 500</td></tr>
<tr><td>N</td><td>50</td><td>625</td></tr>
<tr><td colspan="3">NOTE The parameters specified in this Table 1 can typically be achieved by an exponentially decaying lightning impulse current having a time to half value in the range of 350 μs according to IEC 62305-1.</td></tr>
</table></td><td>Refet to Annex 2
Test Model: LDS 16M
<table>
<tr><td></td><td>#1</td><td>#2</td><td>#3</td></tr>
<tr><td rowspan="2">Test 1</td><td>96.52 kA</td><td>101.1 kA</td><td>93.80 kA</td></tr>
<tr><td>2713 kJ/Ω</td><td>2707 kJ/Ω</td><td>2898 kJ/Ω</td></tr>
<tr><td rowspan="2">Test 2</td><td>101.2 kA</td><td>101.7 kA</td><td>100.5 kA</td></tr>
<tr><td>2375 kJ/Ω</td><td>3532 kJ/Ω</td><td>3241 kJ/Ω</td></tr>
<tr><td rowspan="2">Test 3</td><td>100.9 kA</td><td>101.3 kA</td><td>99.28 kA</td></tr>
<tr><td>2676 kJ/Ω</td><td>3388 kJ/Ω</td><td>2984 kJ/Ω</td></tr>
</table></td><td>P</td></tr>
<tr><td>6.6.2</td><td>Acceptance criteria</td><td></td><td>--</td></tr>
<tr><td></td><td>The connection component is deemed to have passed the test if:</td><td></td><td>--</td></tr>
<tr><td></td><td>a) the contact resistance, measured with a source of at least 5 A as close as possible to the connection component is equal to or less than 3 Ωm. The measurement of the contact resistance of the expansion components (E) and the connected conductors (F) is performed between the clamped ends A-B and C-D, as close as possible to the expansion component (see Figure 7). Acceptance criteria for seaming are under consideration;</td><td>Test Model: LDS 16M
Power source: 10A
<table>
<tr><td>#1</td><td>#2</td><td>#3</td></tr>
<tr><td>0.4 mΩ</td><td>0.6 mΩ</td><td>0.8 mΩ</td></tr>
</table>
less than 3 Ωm.</td><td>P</td></tr>
<tr><td></td><td>b) it does not exhibit any crack to normal or corrected vision without magnification nor does it have any loose parts or deformation impairing its normal use;</td><td></td><td>P</td></tr>
</table>

<table>
<tr><th>Clause</th><th>Requirement - Test</th><th>Result - Remark</th><th>Verdict</th></tr>
<tr><td></td><td>c) for connection components classified according to 4.3 a) or connection components classified according to 4.4 a), except for connections made by seaming, where each conductor of specimen assembly shall be tested independently for multiple conductor connectors, there is less than 1 mm movement of the conductor during the test and no damage to the connection component or conductor. This requirement is not applied to connection components classified according to 4.3 b) and permanent connections made by seaming;</td><td></td><td>N/A</td></tr>
<tr><td></td><td>d) for a non-permanent connection component, in accordance with 4.4 b), utilizing screws,the loosening torque is greater than 0.25 and less than 1.5 times the tightening torque. In the case of connectors with more than one screw, only the loosening torque of the first screw is relevant to this test which shall be different each time. For connection components with multiple bolts and screws the manufacturer shall declare the sequence of loosening of bolts and screws to measure the first loosening torque which will be considered. The loosening torques of the remaining bolts and screws can be measured without any loosening torque requirement (see examples in Figure 8). The torque shall be measured at the nut. The screw should be fixed with a wrench and thus secured against turning;</td><td>Test Model: LDS 16M;Unit: Nm
<table><tr><td>#1</td><td>#2</td><td>#3</td></tr><tr><td>8.0</td><td>8.0</td><td>8.5</td></tr></table></td><td>P</td></tr>
<tr><td></td><td>e) for a connection made by bolting where the bolt is secured by a securing nut, the securing nut shall be removed prior to the measurement of the loosening torque. During the removal of the securing nut, the nut underneath the securing nut shall be fixed with a wrench and thus secured against turning. It shall be possible to completely dismantle test joints classified according to 3.9.</td><td></td><td>P</td></tr>
<tr><td></td><td>f) for a non-permanent connection component, in accordance with 4.4 b), the 20 mm length of conductor from the connector (see Figure 1 , Figure 2, Figure 4), prior to the test, is not less than 3 mm after completion of the test. For connection configurations where at least one conductor terminates within the connector (see connection arrangements B3, B4, B6 and B8 in Figure B.1), the length of the conductor movement shall not be greater than 20 % of the original length of conductor engagement within the component;</td><td>Test Model: LDS 16M;Unit: mm
<table><tr><td>#1</td><td>#2</td><td>#3</td></tr><tr><td>18.78</td><td>17.77</td><td>18.25</td></tr></table>less than 3 mm movement</td><td>P</td></tr>
</table>

Clause	Requirement - Test	Result - Remark	Verdict
	g) for screw-less or permanent connection components, in accordance with 4.4 a), where each conductor of the specimen assemblies shall be subjected independently to a mechanical tensile force of 900 N ± 20 N, for 1 min and where each conductor shall be tested independently for multiple conductor connectors, there is less than 1 mm movement of the conductor during the test and no damage to the connection component or conductor.	non-permanent connection component	N/A
6.7	Static mechanical withstand-capability test		--
	Connection components classified according to 4.3 a) shall have a sufficient withstand-capability against static mechanical stresses. Verification is performed with the test according to 6.6.2 g).		P
7	Electromagnetic compatibility (EMC)		N/A
8	Structure and content of the test report		--
8.1	General		--
	The purpose of this Clause 8 is to provide general requirements for laboratory test reports. It is intended to promote clear, complete reporting procedures for laboratories submitting test reports.		P
	The results of each test carried out by the aboratory shall be reported accurately, clearly,unambiguously and objectively, in accordance with any instructions in the test methods. The results shall be reported in a test report and shall include all the information necessary for the interpretation of the test results and all information required by the method used.		P
	The report shall be arranged and presented in such a way that it is easily assimilated by the reader. The format shall be specifically designed for each type of test carried out, but the headings shall be standardized as indicated below.		P
	The structure of each report shall include at least the information according to 8.2 to 8.1 0.		P
8.2	Report identification		--
	The following information shall be included.		--
	a) a title or subject of the report.	TEST REPORT	P
	b) name, address and email or telephone number of the test laboratory.	Name: Guangdong LNP Electrical Testing Technology Co., Ltd. Address: No. 101, Building B, Xinyongsheng Technology Park, Wenquan South Road No. 70, Xinwei Village, Shilong Town, Dongguan City, Guangdong Province, China. Email: leo@lnptest.com Tel: +86-769-81329986	P

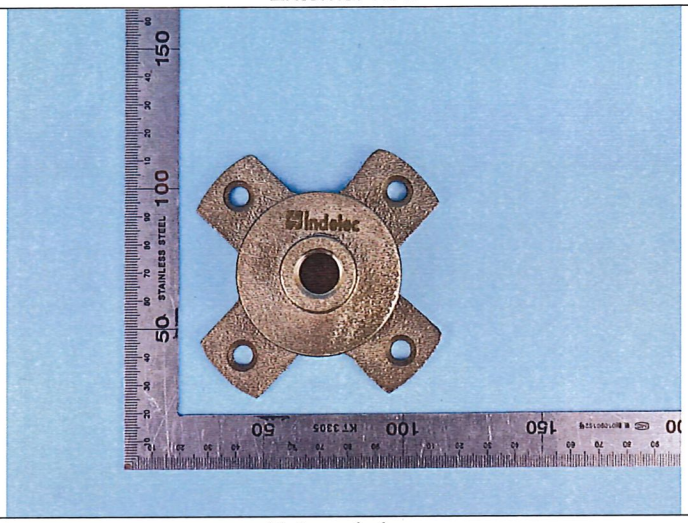
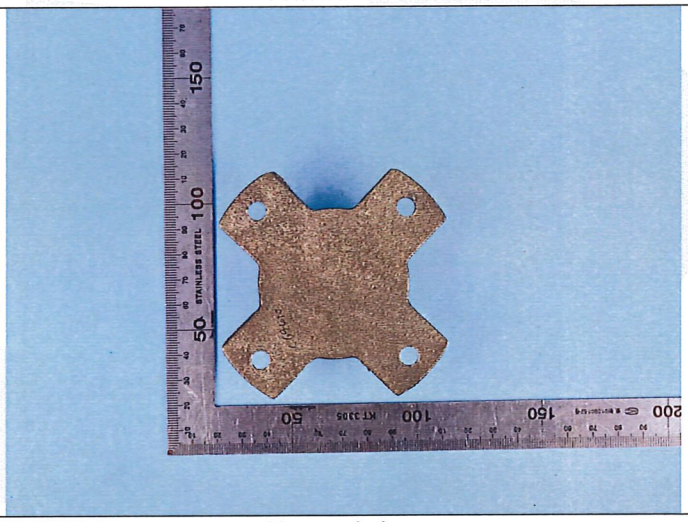
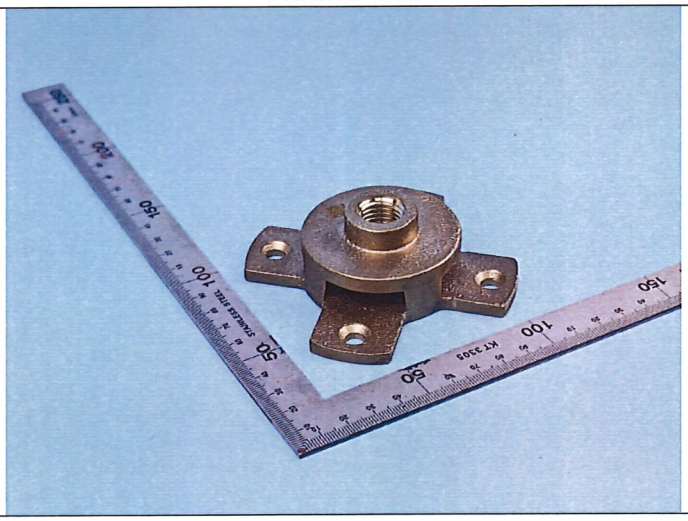
Clause	Requirement - Test	Result - Remark	Verdict
	c) name, address and email or telephone number of the sub test laboratory where the test was carried out if different from the company which has been assigned to perform the test.		N/A
	d) unique identification number (or serial number) of the test report.	P250203401	P
	e) name and address of the vendor.	Name: Indelec SA. Address: 61, chemin des postes 59500 Douai - France	P
	f) page numbers, including the total number of pages.	Total 22 pages	P
	g) date of issue of report.	2025-04-01	P
	h) date(s) of performance of test(s).	2025-03-18 to 2025-04-01	P
	i) signature and title, or an equivalent identification of the person(s) authorized to sign for the testing laboratory for the content of the report;	Andy Chen / Project Director	P
	j) Signature and title of person(s) conducting the test.	Francis Lau / Test Engineer	P
	k) the following declaration in order to avoid misuse: "This type test report shall not be reproduced other than in full, except with the prior written approval of the issuing testing laboratory. This type test report only covers the samples submitted for test and does not produce evidence of the quality for series production."		
8.3	Specimen description		--
	a) Sample description: classification as per Clause 4;	Light Duty Air Rod Saddle	P
	b) detailed description such as basic materials of the sample, screws, nuts, parts, external dimensions, shape, protective or aesthetic coating and unambiguous identification of the test sample or test assembly;	LDS 16M-#1 to #6	P
	c) characterization and condition of the test sample and/or test assembly.	Light Duty Air Rod Saddleis connected air terminal rod and Copper tape	P
	d) sampling procedure, where relevant.		N/A
	e) date of receipt of test items.	2025-03-11	P
	f) photographs, drawings or any other visual documentation, if available.	Refer to annex 1	P
8.4	Conductor		--
	a) conductor material.	Copper	P
	b) nominal cross-sectional area, dimensions and shape. It is recommended that the actual cross-sectional area should also be given.	Diameter of Air terminal is 16mm; 25mm x 3mm Copper tape	P
8.5	Standards and references		--

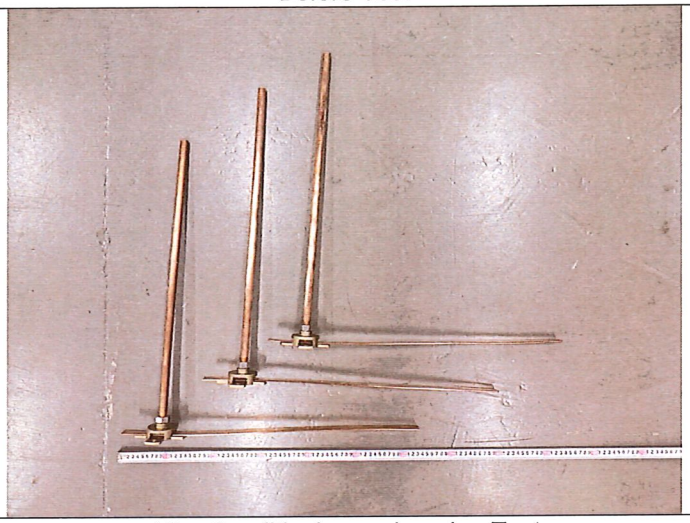
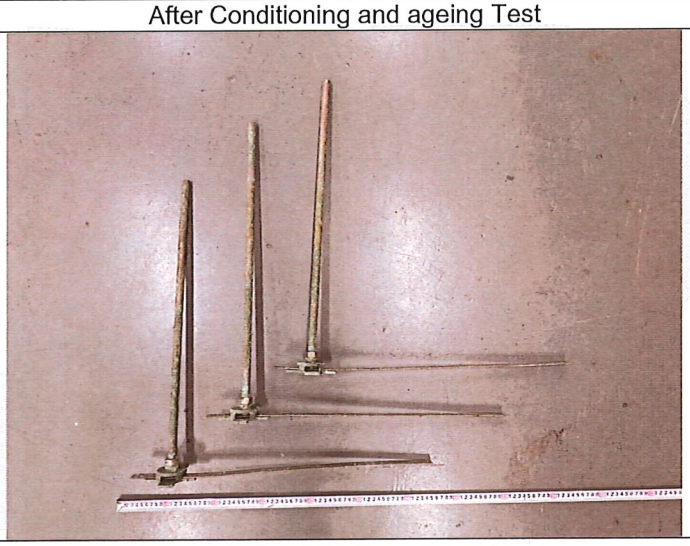
Clause	Requirement - Test	Result - Remark	Verdict
	a) identification of the test standard used and the date of issue of the standard.	IEC 62561-1:2023	P
	b) other relevant documentation with the documentation date.	IEC 60068-2-52:2017; IEC 62561-2 ISO 22479:2019; ISO 6988:1985	P
8.6	Test procedure		--
	a) description of the test procedure.	According to annex C	P
	b) justification for any deviations from, additions to or exclusions from the referenced standard.	No deviations	N/A
	c) any other information relevant to a specific test such as environmental conditions.	25°C ± 10°C，less than 70%RH	P
	d) configuration of testing assembly.		P
	e) location of the arrangement in the testing area and measuring techniques.	Refer to annex 1	P
8.7	Testing equipment description		--
	Description of equipment used for every test conducted, i.e. generator, conditioning/ageing device.	Refer to List of test equipment used	P
8.8	Measuring instruments description		--
	Characteristics and calibration date of all instruments used for measuring the values specified in the standard i.e. radius gauge, shunts, tensile testing machine, extensometer, ohmmeter, torque meter, thickness calliper gauge, etc.	Refer to List of test equipment used	P
8.9	Results and parameters recorded		--
	The measured, observed or derived results shall be clearly identified at least for:	Refer to Annex 2	P
	a) current peak value;		P
	b) specific energy;		P
	c) front time of the impulse;		P
	d) time to half value;		P
	e) resistance;		P
	f) tightening torque;		P
	g) loosening torque.		P
	The above shall be presented by means of tables, graphs, drawings, photographs or other documentation of visual observations as appropriate.		P
8.10	Statement of pass/fail		--
	A statement that the specimen passed or failed the tests shall be reported. If the specimen has failed, a description of failure is necessary.	Pass	P

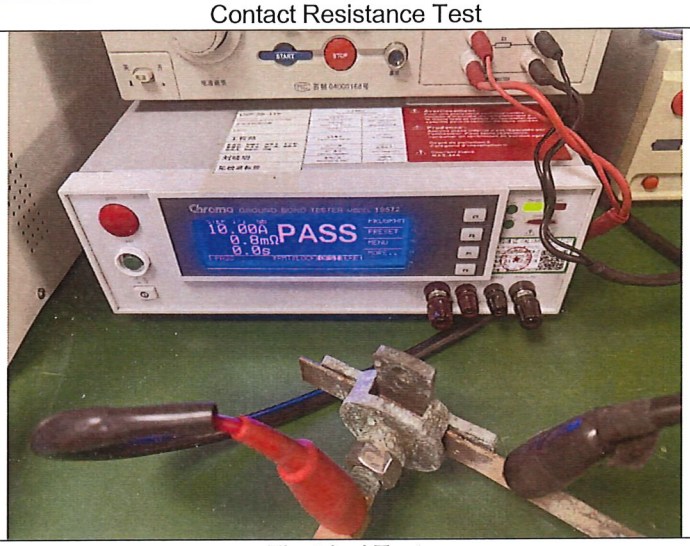
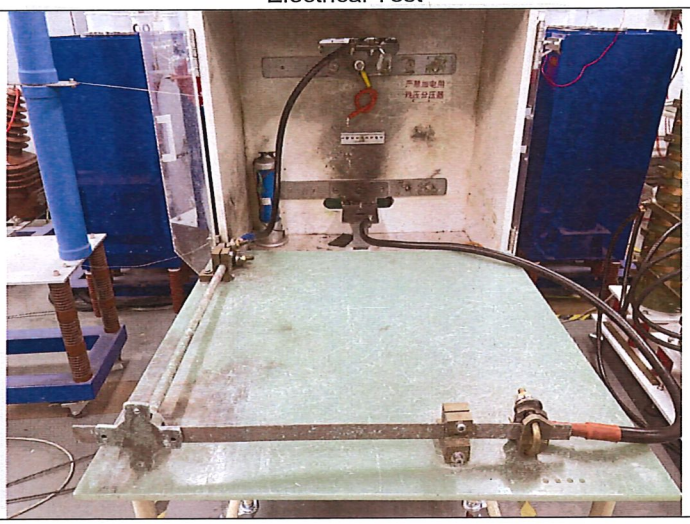
Clause	Requirement - Test	Result - Remark	Verdict
Annex A (normative)	Summary of the requirements and corresponding tests		P
Annex B (informative)	Typical connection configurations for various LPSCs	According to B.4	P
Annex C (normative)	Flowchart of tests for connection components		P
Annex D (normative)	Conditioning and ageing for connection components	Light Duty Air Rod Saddle	--
D.1	General		--
	The condition/ageing test consists of a salt mist treatment as specified in Clause D.2 followed by humid sulphurous atmosphere treatment as specified in clause D.3 and an additional ammonia atmosphere treatment for specimens where any component part is made of copper alloy with a copper content less than 80%, as specified in Clause D.4.	D.2 and D.3 were tested.	P
	The manufacturer or supplier shall provide proof of the copper content of any part of the assembly made from a copper alloy.		P
D.2	Salt mist treatment		--
	The salt mist treatment shall be in accordance with IEC 60068-2-52:201 7 except for Clause 7, Clause 1 0 and Clause 1 1 which are not applicable. The test is carried out using severity (2).	Severity (2) 35°C, 2h;	P
	If the salt mist chamber maintains the temperature conditions as specified in IEC 60068-2-52:201 7, 9.3 and a relative humidity of not less than 90 % then the specimen can remain in the chamber for the humidity storage period.	40°C, 93% RH, 22h	P
D.3	Humid sulphurous atmosphere treatment		--
	The humid sulphurous atmosphere treatment shall be in accordance with ISO 22479:2019 Method B with 7 cycles with a volume concentration of sulphur dioxide of 667 x 10^{-6} ± 25 x 10^{-6}, except for Clauses 9 and 10 which are not applicable.	667 x 10^{-6}	P
	Each cycle which has a duration of 24 h is composed of heating period of 8 h at a temperature of 40°C ± 3°C in the humid saturated atmosphere which is followed by a rest period of 16 h. After that, the humid sulphurous atmosphere is replaced.	40°C , 8h and in the humid saturated atmosphere which is followed by a rest period of 16 h.	P
	If the test chamber maintains the temperature conditions as specified in 6.5.2 of ISO 22479:2019, 8.5 then the specimen can remain in the chamber for the storage period.		N/A
D.4	Ammonia atmosphere treatment		--

Clause	Requirement - Test	Result - Remark	Verdict
	The ammonia atmosphere treatment shall be in accordance with ISO 6957:1988 for a moderate atmosphere with the pH value of 10, except for 8.4 and Clause 9 of the ISO document which are not applicable.	Copper content is 85%, the result of chemical composition is from mill cert.	N/A
Annex E (normative)	Reduced test procedures		N/A

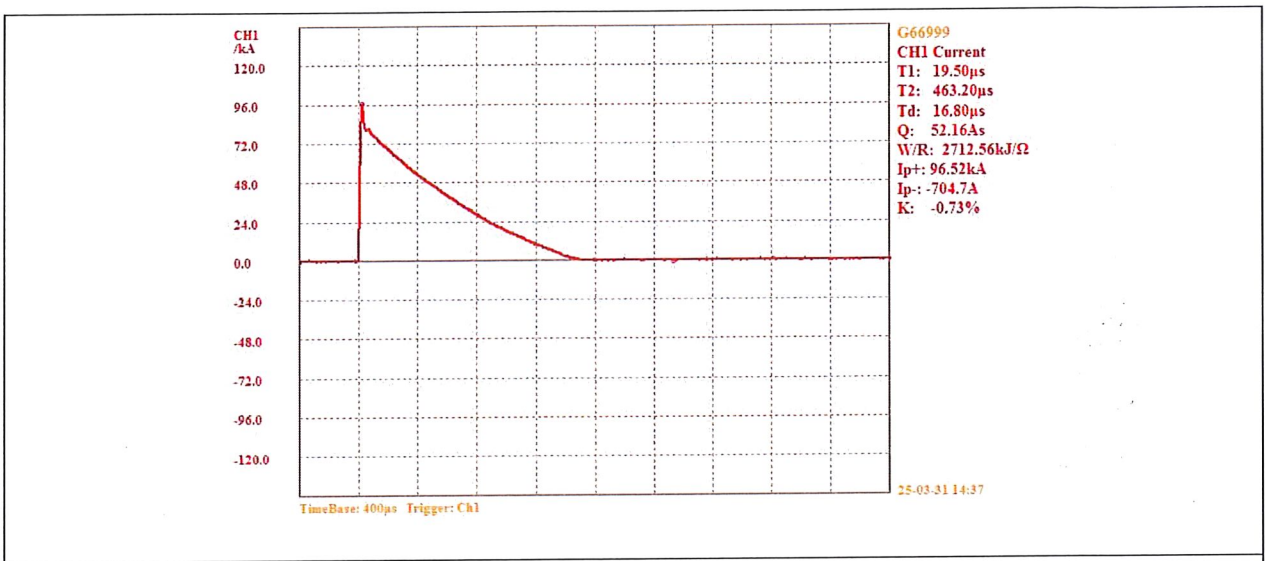
Annex 1: Photos of samples

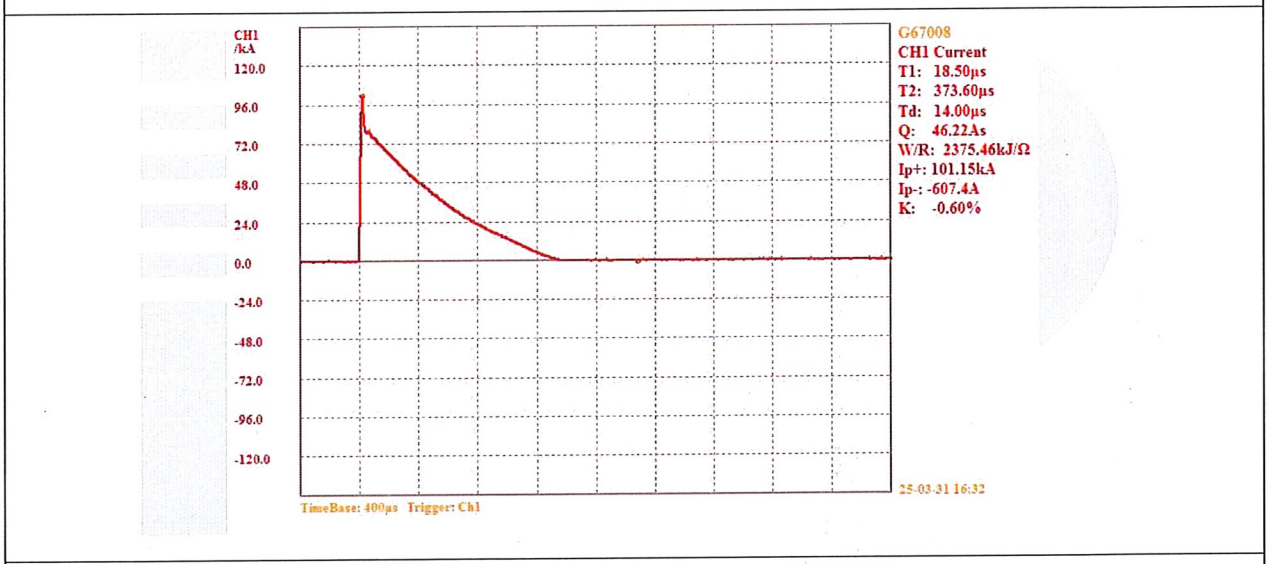
Details of:	External view
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	
Details of:	External view
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	
Details of:	External view
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

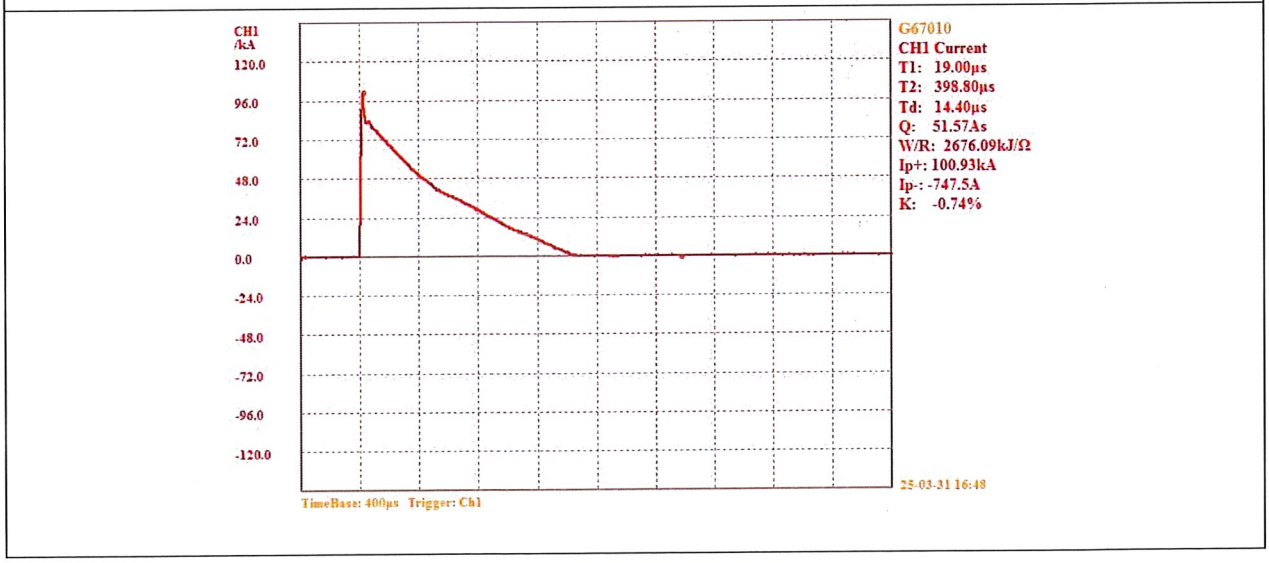
Details of:	Before Test
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	
Details of:	After Conditioning and ageing Test
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

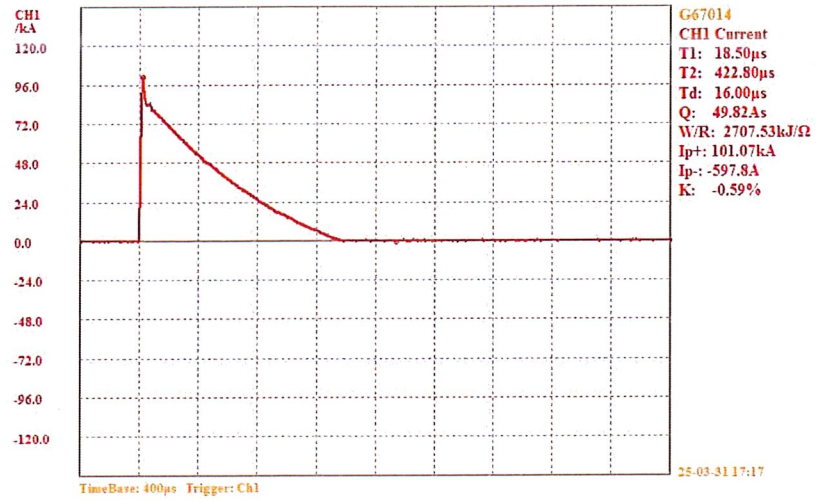
Details of:	Contact Resistance Test
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	
Details of:	Electrical Test
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Annex 2 Testing waves

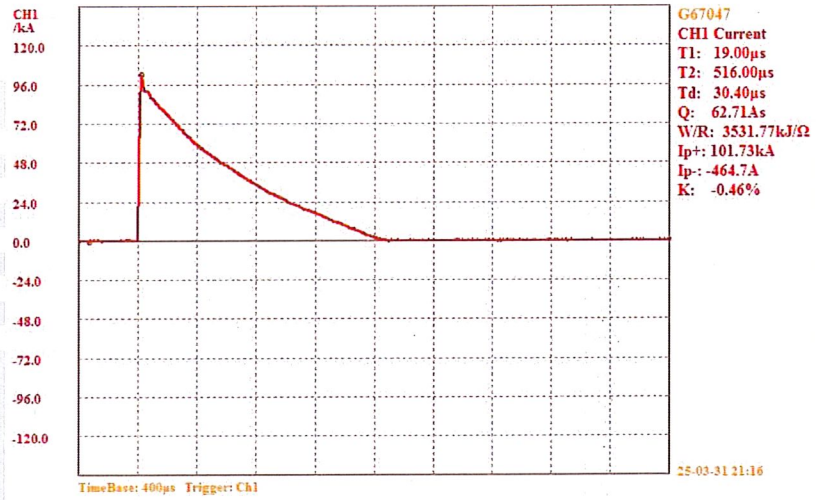




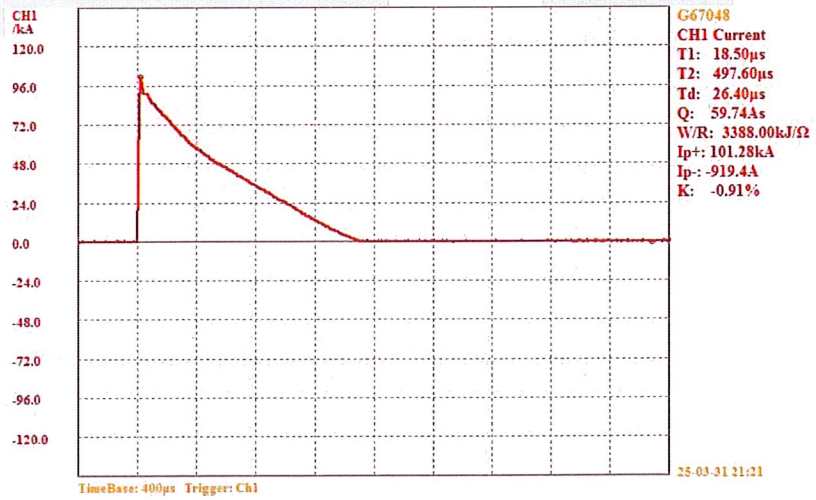




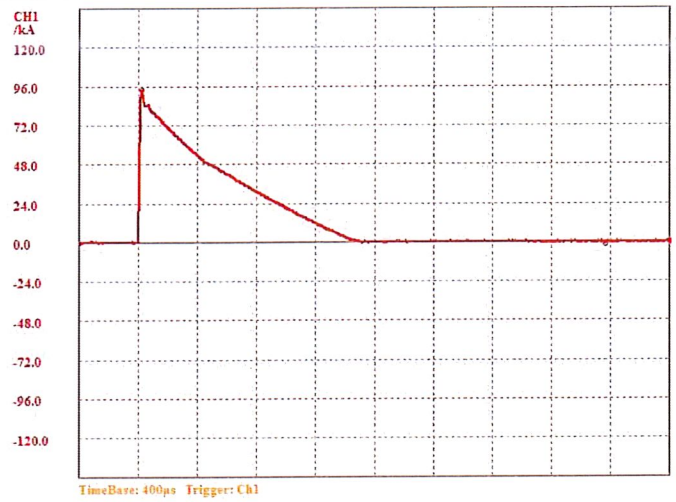
G67014
CH1 Current
T1: 18.50μs
T2: 422.80μs
Td: 16.00μs
Q: 49.82As
W/R: 2707.53kJ/Ω
Ip+: 101.07kA
Ip-: -597.8A
K: -0.59%
25-03-31 17:17



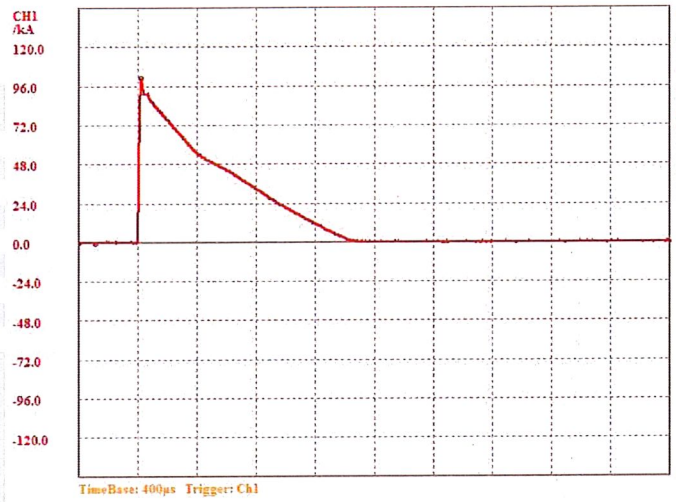
G67047
CH1 Current
T1: 19.00μs
T2: 516.00μs
Td: 30.40μs
Q: 62.71As
W/R: 3531.77kJ/Ω
Ip+: 101.73kA
Ip-: -464.7A
K: -0.46%
25-03-31 21:16



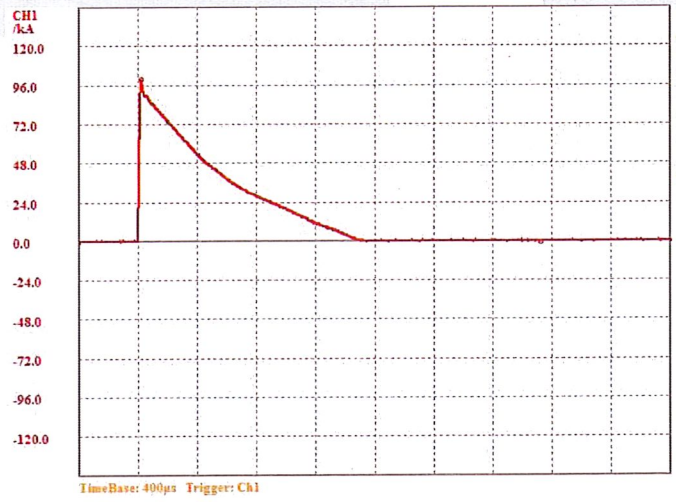
G67048
CH1 Current
T1: 18.50μs
T2: 497.60μs
Td: 26.40μs
Q: 59.74As
W/R: 3388.00kJ/Ω
Ip+: 101.28kA
Ip-: -919.4A
K: -0.91%
25-03-31 21:21



G67057
CH1 Current
T1: 17.00μs
T2: 500.80μs
Td: 27.20μs
Q: 54.78As
W/R: 2898.15kJ/Ω
Ip+: 93.80kA
Ip-: -1.07kA
K: -1.14%
25-03-31 23:33



G67059
CH1 Current
T1: 18.50μs
T2: 465.20μs
Td: 54.00μs
Q: 57.34As
W/R: 3241.06kJ/Ω
Ip+: 100.47kA
Ip-: -504.9A
K: -0.50%
25-03-31 23:37



G67062
CH1 Current
T1: 18.00μs
T2: 444.40μs
Td: 29.60μs
Q: 54.44As
W/R: 2984.12kJ/Ω
Ip+: 99.28kA
Ip-: -651.1A
K: -0.66%
25-03-31 23:40

List of test equipment used

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
Annex D.2	Salt mist treatment	Salt mist treatment tester / LNP-SB-086	1-2ml/80cm² /h, 35°C	2024/5/23	2025/5/22
Annex D.2	Salt mist treatment	Temp. & Hum. Chamber / LNP-SB-011	-40°C～150°C; 30%～98% RH	2024/11/22	2025/11/21
Annex D.3	Humid sulphurous atmosphere treatment	Humid sulphurous atmosphere treatment Machine / LNP-SB-088	667x10-6, 40°C	2024/6/21	2025/6/20
6.4	Electrical test	Impulse current generator / LNP-SB-001	10/350us 10kA~150kA	2024/6/5	2025/6/4
6.4	Electrical test	Ground Resistance Tester / LNP-SB-064	30A 0.1~600mΩ	2025/2/21	2026/2/20
6.4	Electrical test	Torque wrench / LNP-SB-105	5-60Nm	2024/11/22	2025/11/21
--	Ambient	Hygrothermograph / LNP-SB-111	-20° C~60° C; 0%~95%RH	2024/8/8	2025/8/7

END OF REPORT