中国认可
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检测
TESTING
CNAS L12422

TEST REPORT
IEC 62561-7
Lightning protection system components (LPSC)
Part 7: Requirements for earthing enhancing compounds

Report Number.....:	P250203501
Date of issue.....:	2025-03-14
Total number of pages.....:	7
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 62561-7:2024
Test procedure.....:	Commissioned test
Non-standard test method.....:	N/A
Test item description.....:	EARTHING ENHANCING COMPOUNDS (EEC PLUS)
Trade Mark.....:	Indelec
Manufacturer.....:	Indelec SA.
Model/Type reference.....:	ARJ 302
Size.....:	25kg

Copy of marking plate

Description	EARTHING ENHANCING COMPOUNDS (EEC PLUS)
Model	ARJ 302
Trade Mark	Indelec
Manufacturer	Indelec SA.

Test item particulars.....:	EARTHING ENHANCING COMPOUNDS (EEC PLUS)
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..... :	2025-03-05
Date (s) of performance of tests.....:	2025-03-05 to 2025-03-14

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 as listed in table below:

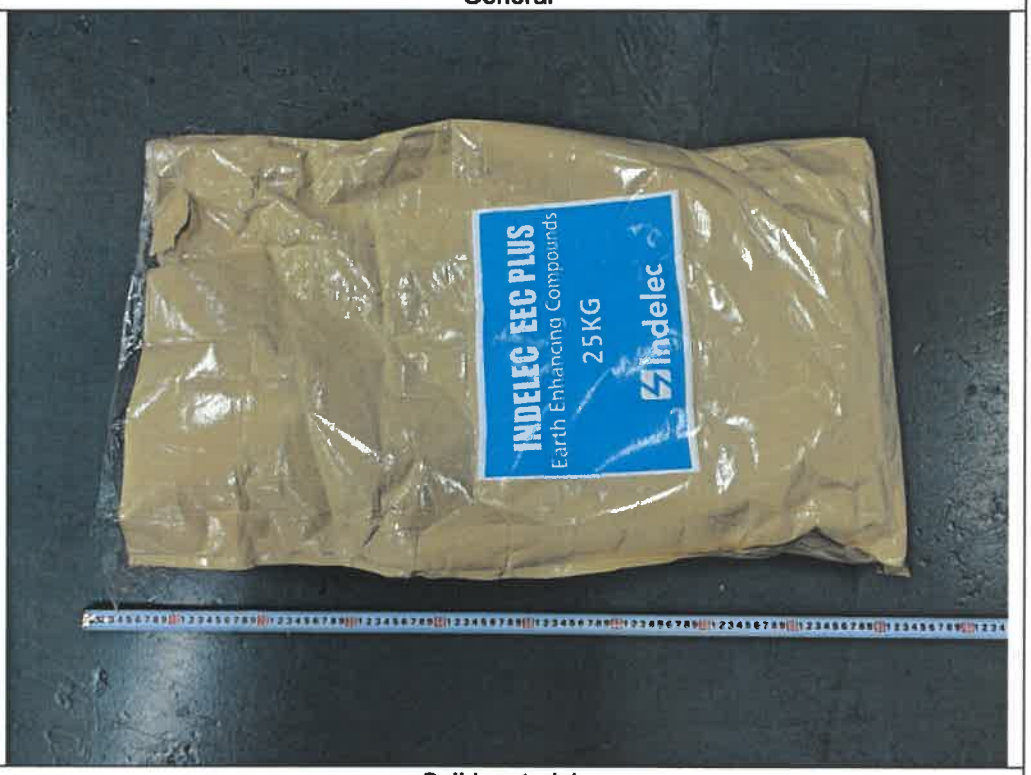
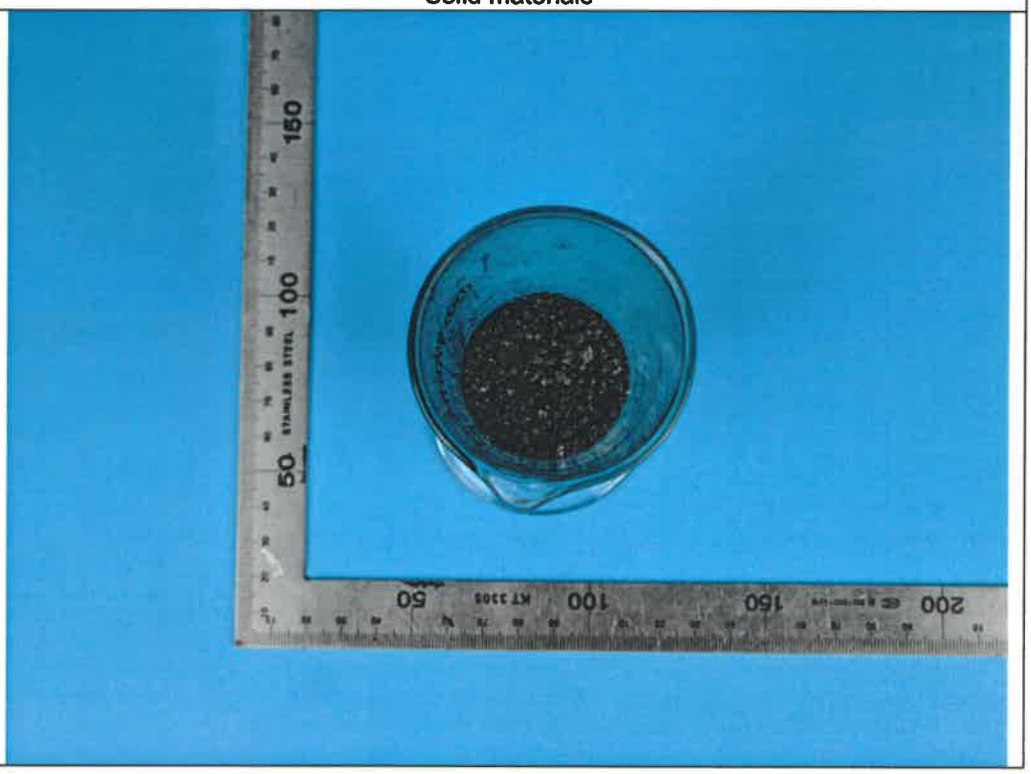
Clause	Test items	Sample No.:
5.4	Determination of resistivity	#1, #2, #3
5.5	pH measurement	#4, #5, #6

Clause	Requirement - Test	Result - Remark	Verdict
5.4	Determination of resistivity		P
5.4.1	General		P
	The four-electrode method shall be used to determine the resistivity of earthing enhancing compounds as described in ASTM G57-20. Representative samples of the materials shall be taken from a typical packaging as provided by the manufacturer and prepared in accordance with the manufacturer's instructions. Three samples of the earthing enhancement material shall be tested in a four-electrode soil box.		P
	With the four-electrode method, a voltage is applied to the outer electrodes, which causes current to flow. The resulting voltage drop between the inner electrodes is measured using a voltmeter, and the resulting resistance is calculated. The resistance of the material can also be measured directly.		P
	The resistance of each earthing enhancing compound sample shall be converted to the resistivity value using the following formula: $\rho=RxA/a$		P
5.4.2	Testing apparatus		P
	The following apparatus are permitted to be used:		P
	a) Any reliable commercially available earth resistance meter having two current and two voltage terminals or a low frequency AC source, a high input impedance voltmeter and ammeter. Typical connections for use of a soil box with various types of instruments are shown in Figure 1.		N/A
	b) Four-electrode soil box, made of an inert non-conductive material with four permanently mounted electrodes manufactured of mild or stainless steel. Soil boxes are commercially available or can be constructed in various sizes, as long as the inside dimensions are known.		P
	c) Connecting cables.		N/A
5.4.3	Test procedure		P
	The earthing enhancing compound shall be prepared in accordance with the manufacturer's instructions. If the material is to be installed as provided, with no preparation required, the earthing enhancing compound shall be tested as received.		P
	The resistance measurements shall be taken after the elapsed time, as specified by the manufacturer, to allow for curing or maturing if required.		P

Clause	Requirement - Test	Result - Remark	Verdict
	The sample of the earthing enhancing compounds shall be placed in the soil box in a manner to ensure good constant electrical contact between the earth enhancing compound and the electrodes. For solid materials, a standard 100 N/m2 pressure should be applied evenly to the surface of the material under test within the soil box for a period of 1 h and be maintained during the resistance measurement.		P
	The resistance R of the samples shall be measured using the earth resistance meter or technical method (derived from current and voltage measurements) and the resistivity of each sample shall be calculated in accordance with 5.4.1.		P
	The tests shall be carried out at an ambient temperature in the range of +15 °C to +25 °C. The temperature at the time of measurement shall be recorded.		P
5.4.4	Acceptance criteria		P
	The specimens are deemed to have passed the tests if the obtained resistivity value from the three samples are equal to or less than the resistivity value claimed by the manufacturer.	Measured value: 0.026Ω·m	P
5.5	pH measurement		P
5.5.1	General		P
	This test covers the procedure for determining the pH of slurries coming from the materials used as earthing enhancing compounds. The significance of the test is important because the earthing enhancing compounds shall be physically and chemically inert with the earth electrodes, to avoid corrosion to the earth electrodes and damage to the surrounding environment.		P
5.5.2	Testing apparatus - Reagents1		P
	a) pH meter comprising a potentiometer equipped with a glass-calomel electrode system. Follow the manufacturer's instructions for the pH meter used.		P
	b) Calomel and glass electrodes or equivalent, suitable for measuring viscous slurries or for measuring soils. A combination electrode consisting of a saturated calomel reference electrode and a glass electrode combined as a single electrode is acceptable.		P

Clause	Requirement - Test	Result - Remark	Verdict
	c) Thermometer. Some pH electrodes have temperature compensation built in as part of the pH electrode, but most do not (see manufacturers' specifications). A thermometer of rugged construction is required for calibration, and a stainless-steel sheathed thermometer is preferred. Metal sheathed thermometers come in different lengths, and a length appropriate for the depth of interest should be chosen.		P
	d) pH reference solution for the calibration of the pH meter prepared in accordance with the manufacturer's instructions. Usually buffers having a pH of 4, 7 and 10 are used as reference solutions.		P
	e) Deionized water.		P
	f) Glassware.		P
	g) Mixer.		P
	h) Balance with an accuracy of ±0,01 g.		P
5.5.3	Material preparation		P
	The volume of the material to be tested shall be that appropriate for the pH meter used to perform the test.		P
	If the material is provided commercially in wet form, then it shall be tested as received.		N/A
	If the material is provided commercially in dry form and used in wet form, then a slurry shall be prepared by mixing the solid and liquid phases in accordance with the manufacturer's instructions. Mixing will continue until the produced slurry is homogenous without any coagulates.		P
	If the material is provided commercially and used in dry form, then it shall be tested as received.		N/A
5.5.4	Test procedure		P
	The tests shall be carried out at an ambient temperature in the range of +15 °C to +25 °C. The temperature at the time of measurement shall be recorded.		P
	a) The pH meter is calibrated with the reference solution to the range of the expected pH range in accordance with the instructions of the pH meter's supplier.		P
	b) The electrode is immersed in the material to be tested. Read and report the pH to the first decimal place.	pH value: 8.9	P
5.5.5	Acceptance criteria		P
	No acceptance criteria are required. This measurement is done to determine the aggressiveness of the EEC.		P

Annex 1: Photos of samples

Details of:	General
View: ☒ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	
Details of:	**Solid materials**
View: ☐ General ☐ Front ☒ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

END OF REPORT

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INDELEC NANNING CO., LTD
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info@indelecn.com Tel：86 771-3210455

**** MATERIAL SAFETY DATA SHEET ****
快件声明物安全特性报告

MSDS Name (报告物名称) : Earth enhancing compound 长效物理降阻剂

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****
第一部分 化工产品及发件单位

MSDS Name(报告物名称): Earth enhancing compound 长效物理降阻剂
Catalog Numbers(化工品分类号):HS CODE: 3824909990
Synonyms(又名): Earth enhancing compound 长效物理降阻剂
Company Identification(发件公司名称): INDELEC NANNING CO., LTD
Add : NO.8 KEYUAN EAST 5 ROAD,NANNING,GUANGXI CHINA.
For information, call(一般联系电话): 86 -771- 3210455

1. **Product Name(产品名称)** : Earth enhancing compound 长效物理降阻剂
   Recommended used(用途): conductive compound producing low resistance of an earth termination system 在电力，电气接地系统中，为了降低接地电阻，在土壤中埋入此产品，并包裹在接地导体周围，可以大大降低接地电阻
   Composition / Information on Ingredients 成分/组成信息
   Chemical name（成分名称）:

Graphite 石墨	10%	CAS: 7782-42-5
Bentonite 膨润土	50%	CAS:1302-78-9
Industrial salt （Potassium chloride）工业盐（氯化钙）	15%	CAS:7447-40-7
Curing agent （Calcium carbonate）固化剂（碳酸钙）	15%	CAS :471-34-1
Conductive cement 导电水泥	10%	----

2. **Physical and Chemical Properties Tested according to（物理化学性质）**
   Form（形态）: powder 干粉状
   Colour（颜色）: Black gray 黑灰色
   Aprrearance and Odour（表面气味）: Weak odor 稍有气味
   Meld Point（熔点）: none 无
   PH value（PH 值）: none 无
   Flash point（闪点）: none 无
   Explosive properties（爆炸性）: none 无
   Relative density（相对密度）: none 无
   Solubitity（溶解性）: none 无
3. **Particular size（目数大小）: 400**
4. **Stability and Reactivity（稳定性和反应性）**
   Stability（稳定性）: good 好
   Conditions to avoid（避免接触的情况）: none 无
   Materials to avoid（避免接触的物质）: none 无
   Hazardous decomposition products（产生有害物质）: none 无

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5. Handling and Storage（处置和储存）

Handling（处置）: bags 袋装

Technical measures/Precautions: Avoid formation of respirable particles.技术和防范措施：none 无

Safe handling advice（安全处置建议）: none 无

Storage（储存）:bags 袋装

Technical measures/Storage conditions: Keep in a dry place.

技术措施/储存条件： 保持在干燥的地方

Incompatible products（不兼容产品）:None 无

Packaging material（包装材料）：plastic bag （塑料袋）

6. Breath protect（呼吸防护）: none 无

7. Hand protect（手防护）: With safety gloves.（戴手套）

8. Eye protect（眼睛防护）: none 无

9. Fire Fighting Measures （消防措施）

Suitable extinguishing medis（适合阻燃性）: none 无

10. Healthy and Dangerous（健康和危险性）: none 无

Animal date（动物日期）: none 无

Acute toxicity（严重毒性）: none 无

Eye irritation（眼镜刺激）: none 无

Specific effects（特殊情况）: none 无

Skin contact（皮肤接触）: none 无

Eye contact（眼睛接触: none 无

Inhalation（吸食）: none 无

Lungs（肺）: none 无

Titanium Dioxide（二氧化钛）: none 无

Inhalation（吸食）: none 无

Upper respiratory tract（上呼吸道）: none 无

11.First and Measures （第一防护措施）

Into eyes（进入眼睛）: wash with flowing clean water.（用清水冲洗）

Skin contact（皮肤接触）: flush with soap,wash by clean water.（使用香皂，用清水冲洗）

Inhalation（吸食）: Move to fresh air. Consult a physician after significant exposure.
移到新鲜空气的地方，及时就诊。

12Ecological Information（生态学资料）

Persistence and degradability（留存和降解性）: none 无

Ecotoxicity effects（生态毒性）: none 无

对于鱼类毒性：none 无

13. Cleanning:（清洁）

Mehtods for cleaning up（清洁方法）: Flush away traces with water. 清水冲洗

Avoid dust formation（避免粉尘的形成）: After cleaning, Flush away traces with water.
清洁后，用水冲刷

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14. Transportation informations:（运输信息）

Not classified as dangerous in the meaning of transport regulations.

运输规则中不属于危险品

Transport information

Land transport ADR/RID (cross-border)

ADR/RID class : Not regulated

UN-Number :Not regulated

Maritime transport IMDG: Not regulated

IMDG Class :Not regulated

Marine pollutant :NO

ICAO/IATA Class :Not regulated

15. Personal Protection（个人防护）

Eye protection（眼镜保护）:Safety glasses（戴安全眼镜）

Hygiene measures（卫生措施）: Wash hands before breaks and at the end of work day.

16.Other information 其他信息

Note: It is the user`s responsibility to determine the suitability of this information for adoption of necessary precautions. We reserve the right to revise material safety data sheets as new information become available.

注意：这是用户通常情况下的防护采取的必要措施。当有新信息时，我们有权修改安全技术说明书。

一天工作结束后，休息前洗手

Reported by: (报告人)

Company Name :. INDELEC NANNING CO., LTD
公司名称：广西南宁英得里克机电有限公司

Date:2025-1-2
日期： 2025 年 1 月 2 日

Authorized person:
报告人：