TEST REPORT: 7191221856-CHM19-NYL

Date: 12 NOV 2019 Tel: +65 68851291 Fax: +65 67784301

Client's Ref: Email: lei.yang@tuv-sud-psb.sg

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SUBJECT

Testing for Lightning Protection System Components (LPSC)

CLIENT

Sankosha Corporation
Osaki 4-3-8
1410032 Shinagawa-Ku
Japan

Attn: Mr. Toshikatsu Kawai

SAMPLE SUBMISSION DATE / TEST DATE

23 Sep 2019 / 02 - 15 Oct 2019

DESCRIPTION OF SAMPLE

One bag of sample labelled as "SAN-EARTH" (Made in Vietnam) was received from the client on 23rd September.

METHOD OF TEST

IEC 62561-7: 2018 and BS EN 62561-7: 2018 Lightning Protection System Components (LPSC), Part 7: Requirements for earthing enhancing compounds.

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RESULT SUMMARY

Test Standard	Description	Pass/Fail
IEC 62561-7: 2018 and BS EN 62561-7: 2018, Clause **5.2**	Leaching test	Pass
IEC 62561-7: 2018 and BS EN 62561-7: 2018, **Clause 5.3**	Sulphur determination	Pass
IEC 62561-7: 2018 and BS EN 62561-7: 2018, **Clause 5.4**	Determination of resistivity	Pass
IEC 62561-7 2018 and BS EN 62561-7: 2018, **Clause 5.5**	Corrosion test	Pass

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RESULTS

Clause 5.2 Leaching Test

The leaching test was performed according to EN 12457-2 and determination of concentrations of the metals by EN 16192.

S/N	Leachable Ions	Concentration, mg/L	Passing Criteria with reference to EPA waste water regulatory level, mg/L
1	Iron, Fe	Not Detected*	-
2	Copper, Cu	Not Detected*	5
3	Zinc, Zn	Not Detected*	10
4	Nickel, Ni	Not Detected*	10
5	Cadmium, Cd	Not Detected*	1
6	Cobalt, Co	Not Detected*	-
7	Lead, Pb	Not Detected*	5

*The method detection limit was 1.0 mg/L.

Clause 5.3 Sulphur Determination

Sulphur content with reference to ISO 4689-3

S/N	Concentration	Passing Criteria
Sulphur, S %	0.30	< 2

Clause 5.4 Determination of Resistivity

Determination of resistivity using a four-electrode soil box as per ASTM G57-06.
Materials for the test are mixed in the following ratio and tested immediately:

6 Parts SAN-EARTH : 4 Parts water

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Resistivity (*R*)				Criteria
1	**2**	**3**	**Average**	
136.38 Ω.cm	136.52 Ω.cm	136.38 Ω.cm	136.4 Ω.cm	< 300 Ω.cm

The resistance R is determined to be 136.4 Ω.cm. The sample complies with the client's criteria of < 300 Ω.cm.

Clause 5.5 Corrosion Tests

Corrosion Tests by electrochemical system as per ASTM G 59-97 and ASTM G 102-89
Materials for the test are mixed in the following ratio and used as the electrolyte for the test:

6 Parts SAN-EARTH : 4 Parts water

A client prepared electrode with an exposed surface of 10.214 cm^2 (working electrode), a graphite rod (active electrode) and a $Cu/CuSO_4$ (reference electrode) are inserted into the electrolyte and the electrolyte allowed to cure for 15 days (Curing period is at least 24 hours according to manufacturer instruction). The is tested in accordance to ASTM G59-97; as stated in IEC 62561-7: 2018 and BS EN 62561-7: 2018

Resistance of polarization (*R*p)	Criteria
10.5 Ω . m^2	> 4.0 Ω . m^2 for non-aggressive environments > 8.0 Ω . m^2 for aggressive environments

The polarization resistance ***R***p at age 15 days is determined to be 10.5 Ω . m^2. The sample complies with the criteria of > 4.0 Ω . m^2 for non-aggressive environments and of 8 Ω . m^2 for aggressive environments

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Below results were obtained:

Age 15 days

ba (V/dec)	0.05577 V/dec
bc (V/dec)	0.028729 V/dec
Ecorr, Calc (V)	-0.058698 V
Ecorr, Obs (V)	-0.056138 V
jcorr (A/cm^2)	8.0365 E -07 A/cm^2
Corrosion rate on copper(mm/year)	0.018641 mm/year
E Begin (V)	-0.07431 V
E End (V)	-0.030975 V

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MR NG YEW LEONG
ENGINEER
ELEMENTAL ANALYSIS
CHEMICAL & MATERIALS

DR YANG LEI
EXECUTIVE CONSULTANT
ELEMENTAL/ENVIRONMENTAL ANALYSIS
CHEMICAL & MATERIALS

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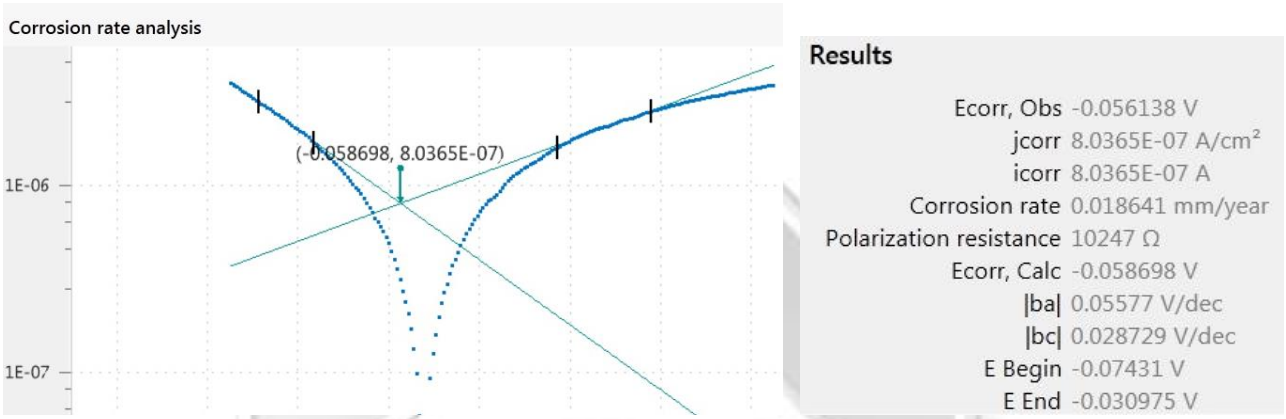
Appendix

Screenshot of resistance of polarization (*R*p) through differentiation of polarization curve

Age 15 days



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