StrikeTape LR High-Current Test Results

WEATHERGUARD LIGHTNING TECH

ISO 9001:2015 • AS9100D CERTIFIED COMPANY

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Test report

The report presents test results from a High Current conducted test on WXGuard lightning diverters utilizing 0.125 inch diameter buttons.

Report No.: 20313-07 V3_0

Date: 2014-05-27

Company, Distributor & Branding Update

Pinnacle Lightning Protection, LLC (DBA Weather Guard Lightning Tech) manufactures and distributes StrikeTape lightning diverters, formerly known as WXGuard.

- StrikeTape diverters, at the time of this report, were branded as "WXGuard."

- Shine Wire, Inc. is no longer a distributor of StrikeTape products.

- All inquiries should be directed to the Weather Guard Lightning Tech customer service team, who exclusively manufacturers StrikeTape products.

List of Content

1 Administrative Data

Date of Test: 1st of May 2014

Customer: Shine Wire Products, Inc.

Contact Person: Greg Shine

Test conducted by: Jimmi Kallesøe, Global Lightning Protection Services A/S Tommy Larsen, Global Lightning Protection Services A/S

Equipment under test: WXGuard segmented lightning diverters with 0.125 inch diameter buttons, Part number 100-100620-0-LR-EDG-NC-400

Test location: Global Lightning Protection Services A/S
HI Park 445
7400 Herning
Denmark

Test purpose: The test is intended to verify the performance when subjected to lighting currents of the LPL1 level in IEC 61400-24.

Signature:

Jimmi Kallesøe
Global Lightning Protection Services A/S

Review:

Søren Find Madsen
Global Lightning Protection Services A/S

Document version	Version date	Revised due to	Written by
V3_0	2014.05.27	Editorial changes	KB
V2_0	2014.05.22	Editorial changes	KB
V1_0	2014.05.02	First version	JK

Table 1 – Revision overview.

2 Executive Summary

The present report presents the tests and results of impulse current testing of WXGuard lightning diverters with 0.125 inch diameter buttons. The aim of the test was to inject impulse currents with specific energies within the tolerances of IEC 61400-24 LPL1.

Three samples of Part number 100-100620-0-LR-EDG-NC-400, each of 10cm length and 1 inch gap from where the arc initiates, were tested. All buttons on every sample on the diverter strip were intact after the tests; hence the test samples passed the LPL1 lightning current test according to IEC 61400-24.

3 Introduction

The present test report covers a High Current test performed on three samples of WXGuard lightning diverters with 0.125-inch diameter round buttons, installed on a glass fibre panel with 1 inch gap to where the arc initiates. The diverter part number was 100-100620-0-LR-EDG-NC-400.

4 Test and Measurement Equipment

The test equipment for the impulse current test was a 200kA crowbar generator. The primary measurement system consisted of a PEMUK Rogowski Coil CWT 1500, which can measure transient currents from 15A to 300kA, at frequencies between 0.03Hz and 16 MHz (3dB bandwidth). The signal from the Rogowski Coil amplifier was recorded by a Tektronix Oscilloscope TDS1001B, controlled and analysed by a National Instruments Labview Code.

The waveform produced by the generator depends on the impedances of the specimen, but can for low resistance samples be shaped within the tolerances of a 10/350µs waveform.

For the first return stroke waveform described in IEC 61400-24, the tolerances of peak current, charge and specific energy are as follows:

- Peak current ±10%
- Charge ±20%
- Specific energy ±35%

Due to the nature of the test samples, the peak currents and specific energies could only be achieved by using damped oscillating pulses. The consequence is that the peak current is slightly above the tolerances specified in IEC 61400-24, whereas the specific energies are well within the tolerances.

5 Test Specification

Three current pulses are injected in each test samples, all aiming at the desired test level of LPL1 in IEC 61400-24. The performance for the lightning diverter is determined by the number of buttons removed by the lightning impact, and the diverter is said to fail if three or more buttons are removed from the diverter strip. The success criteria for the waveform is reached if the specific energy is reached within IEC 61400-24 tolerances.

6 Equipment under Test

Three samples of 10 cm diverter strip with round 0.125 inch button, placed with 1 inch gap from where the arc initiates are tested. Each of the samples are connected to the test generator as seen on Figure 1, where the high terminal of the generator is connected to the bolt on the right side, and the low terminal is connected directly to the lightning diverter.

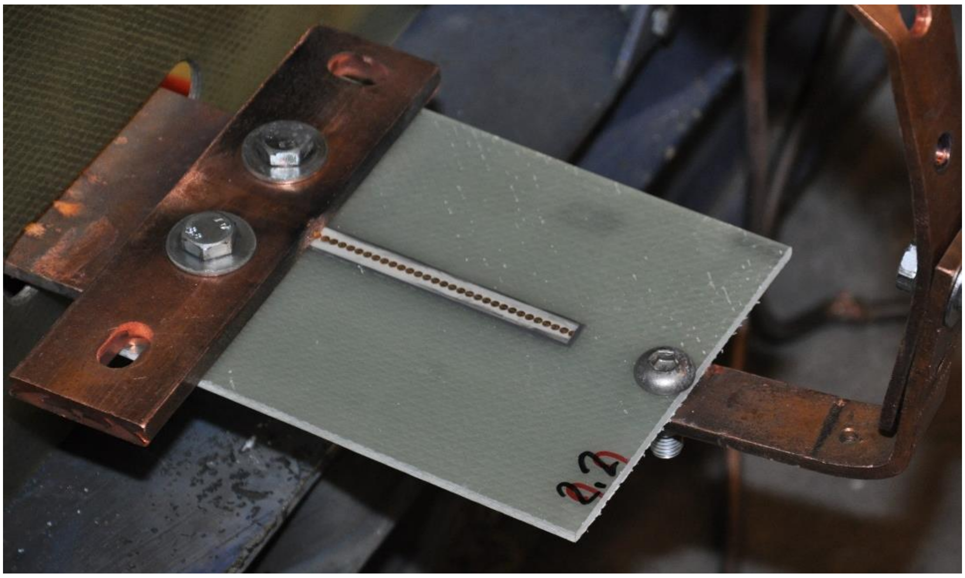

Figure 1 – Test sample 1 installed to the generator, 10 cm diverter strips section attached on a glass fibre panel with 1-inch gap in one end.

7 Test Results

The test results are presented in Table 2 through Table 4. All tests are performed with a damped oscillating waveform. Since the charge impact to the lightning diverters does not depend on the current direction, it is decided to calculate the charge content in the waveform based on the absolute value of the injected oscillating current.

Test No.	Test sample	I_{peak} Measured [kA]	Specific Energy [MJ/Ω]	Absolute Charge [C]	Comments
1	1	229	8.8	74	All buttons intact after the discharge.
2	1	229	8.8	74	All buttons intact after the discharge.
3	1	226	8.4	73	All buttons intact after the discharge.

Table 2 – Test results of sample 1.

Test No.	Test sample	I_{peak} Measured [kA]	Specific Energy [MJ/Ω]	Absolute Charge [C]	Comments
1	2	230	8.6	71	All buttons intact after the discharge.
2	2	231	8.9	73	All buttons intact after the discharge.
3	2	229	8.4	71	All buttons intact after the discharge.

Table 3 – Test results of sample 2.

Test No.	Test sample	I_{peak} Measured [kA]	Specific Energy [MJ/Ω]	Absolute Charge [C]	Comments
1	3	232	8.5	71	All buttons intact after the discharge.
2	3	232	8.6	73	All buttons intact after the discharge.
3	3	231	8.5	71	All buttons intact after the discharge.

Table 4 – Test results of sample 3.

Image before and after the tests of sample 2 is shown on the following figures.

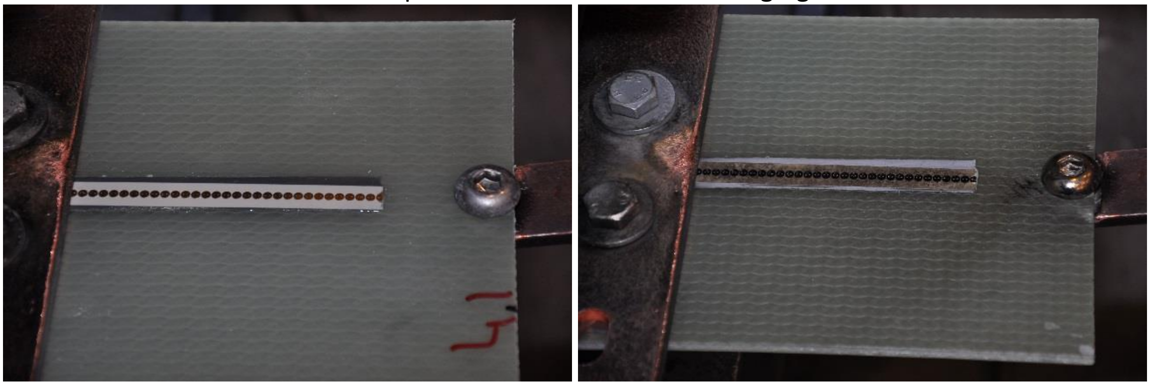

Figure 2 – Left: Sample 2 before all tests. Right: Sample 2 after the first test.

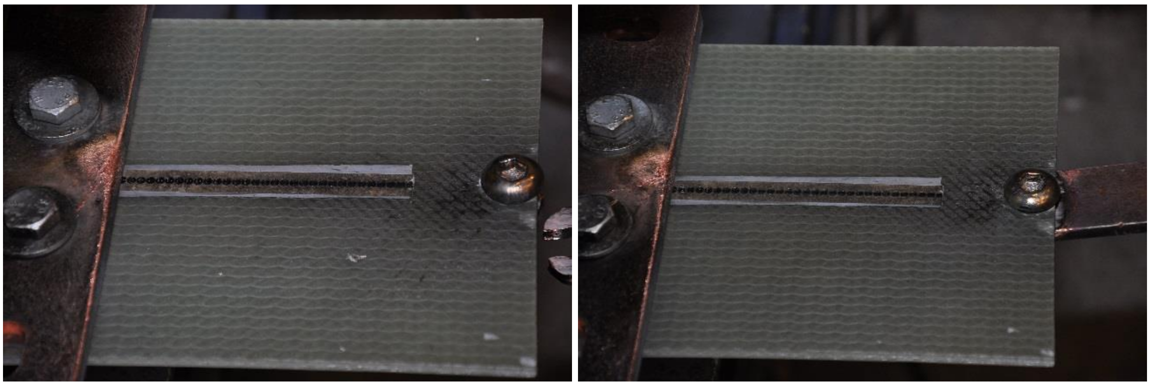

Figure 3 – Left: Sample2 after the second test. Right: Sample 2 after the third test.

Figure 4 – Sample 2 after all three tests, with all buttons intact.

8 Test Conditions

The ambient temperature, humidity and pressure were logged during tests and the maximum and minimum values are shown in Table 5.

Date	Temp [C°]	Pressure [mb]	Humidity [%]
2014.05.01	16.2 – 17.5	1020 - 1022	57 - 61

Table 5 - Maximum and minimum ambient condition during the tests.

9 Images

A total of 82 images were captured during the tests and are provided for download.

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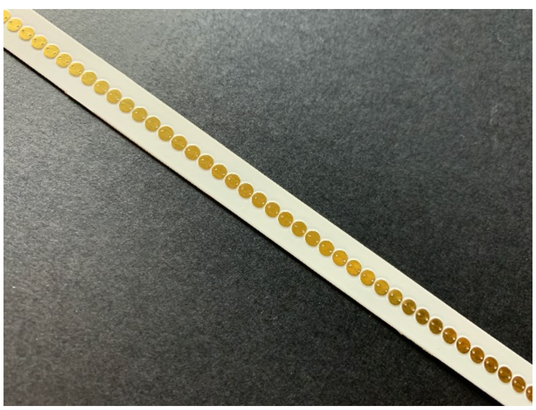

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ABOUT THE COMPANY

- CEO Allen Hall is an FAA Designated Engineering Representative (DER) for Lightning Direct Effects
- In 2006, Weather Guard Lightning Tech was incorporated.
- StrikeTape lightning diverters were developed in 2011 and are in use all over the world.
- In 2020, Weather Guard Lightning Tech earned AS9100D & ISO9001:2015 quality certification.
- Weather Guard Lightning Tech is the Original Equipment Manufacturer of StrikeTape.
- Give our customer service team a call today!

STRIKETAPE

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