

## Test Report

**Description:** LPI Transient Earth Clamp  
**Item:** LPI TEC100  
**Serial Number:** 11713

**Performed By:** Mike Austin  
Principal Electrical Engineer  
**Date:** 12-May-2017

A handwritten signature in blue ink, appearing to read "Michael Austin", written over a horizontal dotted line.

### Version Control

Version	Release Date	Approved	Comments
1.0	15-May-2017	MAA	

### **Commercial In Confidence**

*This document may not be copied, distributed or transmitted in any format, either in part or in full, without the prior written permission of Solux Pty Ltd.*

## 1. Introduction

This report summarises testing and analysis conducted on a sample unit of Lightning Protection International's *Transient Earth Clamp*, model TEC100. Tests were undertaken to confirm the manufacturer's claimed performance ratings, and to check compliance to the relevant clauses of EN62561-1: *Lightning Protection System Components (LPSC). Requirements for connection components* and EN62561-3: *Requirements for Isolating Spark Gaps (ISG)*.

## 2. Summary

The following table summarises the claimed voltage and current ratings for the TEC100, as listed on the product and in the manufacturer's product literature, as well as the values obtained from the tests undertaken as part of this report.

Specification	Value	Result
DC Spark-Over voltage	350V ( $\pm 20\%$ )	356V
Impulse Spark-Over voltage, Up (1.2/50 $\mu$ s, 6kV)	< 1500V	1028V
I <sub>IMP</sub> (10/350 $\mu$ s)	100kA	50kA <sup>1</sup>
I <sub>MAX</sub> (8/20 $\mu$ s)	150kA	136kA <sup>2</sup>

Notes:

1. Due to limitations of the test generator used, the maximum 10/350 $\mu$ s impulse that could be achieved was 50kA
2. Current from the generator was limited to 136kA due to the finite impedance of the TEC100

The relevant clauses of both EN62561-1 and EN62561-3 that apply to the TEC, along with the compliance, or otherwise, of the product tested against these clauses, is summarised in the table below

Standard	Clause	Specification	Result	Comments
EN62561-1	5.3	Lightning Current Carrying Capability	Complies	Product specification complies to "H" classification, however product only tested to "N" classification (see note 1 above)
EN62561-3	5.3	Installation Instructions	Complies	Installation instructions adequate to ensure correct installation
EN62561-3	5.4	Lightning Current Carrying Capability	Complies	Product specification complies to "H" classification, however product only tested to "N" classification (see note 1 above)
EN62561-3	5.5	Rated Sparkover Voltage	Complies	All impulse tests resulted in the TEC operating
EN62561-3	5.6.1	Rated DC Withstand Voltage	Complies	This clause was tested with a DC voltage of 280V, equivalent to the bottom end of the quoted 350V $\pm 20\%$ range.
EN62561-3	5.7	Isolation Resistance	Complies	Resistance measured as in excess of 10M $\Omega$
EN62561-3	5.8	Marking	Complies	No discernible reduction in the legibility of the marking was observed

### 3. Testing & Results

#### 3.1 DC Spark-Over voltage

A DC Voltage was applied to the terminals of the TEC100 and increased at a rate of 100V/s until spark over occurred. The voltage at which spark-over was achieved was 356V.

For evaluation against Clause 5.6.1 of EN62561-3, the above test was repeated however the voltage was not increased beyond 280V, which equates to the low end of the quoted DC sparkover range of 350 +/- 20%. The voltage was kept at this level for a total of 60s and no sparkover of the TEC occurred and leakage current was < 1mA at all times.

#### 3.2 Impulse Spark-Over voltage

A standard 1.2/50 $\mu$ s, 6kV open circuit impulse test wave was applied to the terminals of the TEC100 and the spark-over voltage was measured. The impulse spark-over was 1028V.

For evaluation against Clause 5.5 of EN62561-3, a 1.2/50 $\mu$ s, 1500V open circuit impulse was applied to the terminals of the TEC. A total of 5 positive and 5 negative impulses were applied. The TEC was monitored during each test using an oscilloscope to check that it had operated during the application of each impulse. In all cases, the TEC was determined to have operated correctly.

#### 3.3 I<sub>IMP</sub> and I<sub>MAX</sub>

The claimed impulse rating of the spark gap unit in the N-PE mode is 150kA 8/20 and 100kA 10/350. Due to limitations with the test generator used, it was not possible to test beyond 50kA 10/350 so the claimed 10/350 rating could not be verified beyond 50kA.

The product was first tested using the 8/20 $\mu$ s impulse, both to confirm the 8/20 $\mu$ s rating as well as pre-condition the product in preparation for the 10/350 $\mu$ s test. The current waveform from this test is shown in Figure 1. The peak current measured was 136kA.

At the conclusion of the 8/20 $\mu$ s testing, the product was subjected to the 10/350 $\mu$ s impulse as shown in Figure 2. The peak current measured was 50kA.

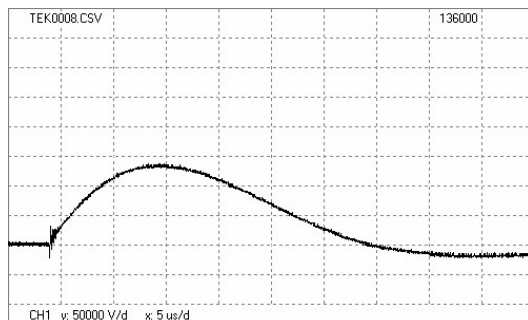


Figure 1 – 8/20 impulse test

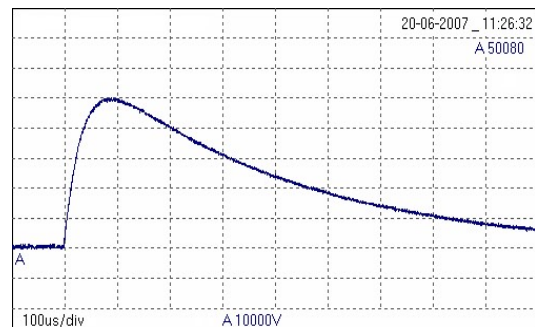


Figure 2 - 10/350 impulse test

After the application of each impulse, the unit was physically examined to ensure no damage had occurred and the Insulation Resistance, DC Sparkover and impulse spark-over tests were performed. The product was found to still be within specification.

### **3.4 Insulation Resistance**

The test is conducted with a DC voltage of 0,5 times the rated withstand voltage, which for the TEC was a value of 175V.

The resistance is measured after 30s of applying the test voltage, by measuring the leakage current and calculating resistance from this figure and the applied DC voltage.

The measured resistance was  $> 10M\Omega$ .

### **3.5 Marking**

The marking was checked by rubbing it by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with isopropyl alcohol.

No degradation in the quality of the marking on the product was detected.

**- END OF DOCUMENT -**