

Document number | CP020_TR_01_0

Product test report


CP020 to IEC 62561-4: 2010



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1 Revision Record

Rev	Description	Prep.	Check'd	App'd	Date
0	Original issue.	A.P.M.	A.P.M.		26/03/2015

2 Introduction

This report details the testing of the Furse component CP020; Non-metallic DC tape clip coloured Grey to suit 25 mm x 3 mm bare conductor in accordance with IEC 62561-4:2010 Lightning Protection System Components (LPSC) – Part 4: Requirements for conductor fasteners.

2.1 Declaration

The above product supplied by Furse has been successfully tested in accordance with IEC 62561-4:2010 Lightning Protection System Components (LPSC) – Part 4: Requirements for conductor fasteners.

Therefore this component is declared appropriate for use in a lightning protection system (LPS) in line with the scope below.

2.2 Scope of Conformity

For use in a lightning protection system (LPS) for the fixing/fastening of rectangular tape in accordance with Furse literature.

3 Variant Part Numbers

GD020, CA020-FU, CA020, CW020-FU, CW020, HW020-FU, HW320, HW420, FP020, SC020, HF020.

**RESEARCH CENTRE FOR TESTS AND DEVELOPMENT
SURGE CURRENT
AND HIGH VOLTAGE LABORATORY
ELEMKO SA**

TEST REPORT No. 31416

**OF NON METALLIC (POLYPROPYLENE) FASTENER WITHOUT SCREWS
DESIGNED TO ALLOW AXIAL MOVEMENT OF THE CONDUCTOR
PART NUMBER : CP020**

APPLICANT :



**APPLICABLE STANDARD:
IEC / BS EN 62561-4:2011**



<http://www.a2la.org/scopepdf/3051-01.pdf>

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ABBREVIATIONS

IEC : International Electrotechnical Commission
ISO : International Standardization Organization
EN : European Norm
A2LA : American Association for Laboratory Accreditation

1. (8.1) Structure and content of the test report

For the purpose of the easier assimilation of this report by the reader and for the better and the complete presentation of the test data, which is required by the standard IEC / BS EN 62561-4:2011, the format of the headings kept the same as it is mentioned in clause 8 of the above standard.

For the better comparison and completeness of this report with the standard's requirements, the corresponding numbering of the standard is also mentioned in each clause, in brackets.

2. (8.2) Report identification**2.1 (8.2.1) Subject / Title**

Description and results presentation of laboratory type testing according to IEC / BS EN 62561-4:2011 on fastener provided by FURSE with part number CP020.

2.2 (8.2.2) Name, address and telephone number of the test laboratory

Research Development and Testing Centre – High Voltage and High Current Testing laboratory
ELEMKO SA

2nd km Thiva-Chalkida Old National Road, GR 32200, THIVA

Tel: (+30) 2262024523 - 2262024574,

Fax : (+30) 2262023571

e-mail: elemko@elemko.gr

2.3 (8.2.3) Name, address and telephone number of the sub contracting test laboratory

There were no tests subcontracted by other laboratory.

2.4 (8.2.4) Number of test report **31416****2.5 (8.2.5) Applicant's name and address**

Request number: 194

Name: W. J. FURSE Ltd.

Address: Wilford Road, Nottingham NG2 1EB,
United Kingdom

2.6 (8.2.6) Total number of pages **12****2.7 (8.2.7) Date of issue of report** **2015/05/28****2.8 (8.2.8) Dates of performance the tests**

Initiation date: 2015/02/24

Closing date: 2015/04/27

2.9 (8.2.9) Authorized person to sign for the testing laboratory for the content of the report

Dr. N. KOKKINOS

Electrical Engineer Beng, MSc, PhD
Laboratory Technical Manager

2.10 (8.2.10) The tests were conducted by

L. KATSIKOIANNIS

Electrical Engineer
Test engineer

S. MARKOU

Laboratory Technician

2.11 (8.2.11) Declaration to avoid misuse

This type test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. This type test report only covers the specimens submitted for test and does not produce evidence for the quality for series production.

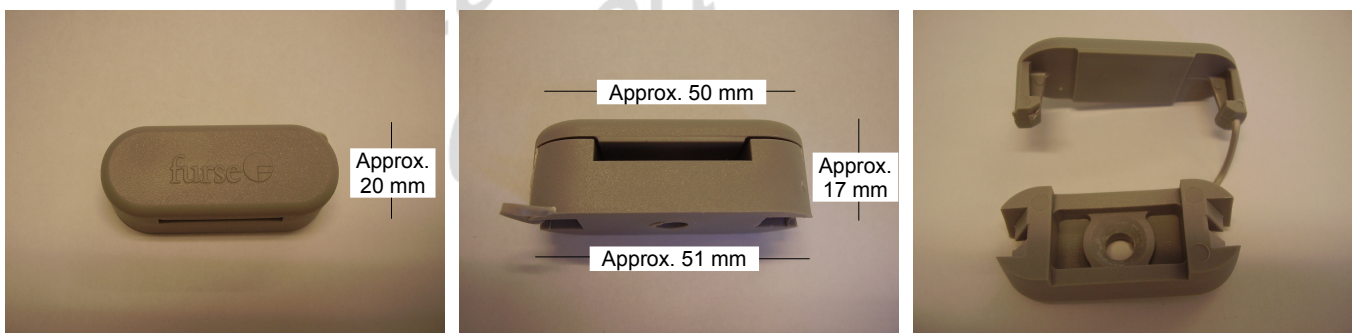
3. (8.3) Specimen description

3.1 (8.3.1) Specimen description

Non metallic (polypropylene) fastener without screws designed to allow axial movement of the conductor, for fastening solid tape conductor 25x3 mm.

3.2 (8.3.2) Functional parts and accessories description

For the functional parts see below photographs.



3.3 (8.3.3) Manufacturing method

Injection moulding.

3.4 (8.3.4) Detailed description and unambiguous identification of the test specimen and/or test assembly

Twelve specimens mounted rigidly by two on insulating plates and assembled to six arrangements (see photos 1a, 1b, clause 4.3 of the report), using stainless steel (SS) solid tape conductor 25x3mm (a first set of three arrangements intended for the lateral load test) and aluminium (Al) solid tape conductor 25x3 mm (a second set of three arrangements intended for the impact test). For traceability:

- a) The arrangements intended for the lateral load test were given the identification numbers 31416 A1-2, 31416 A3-4 and 31416 A5-6 (the numbers 1-2, 3-4 & 5-6 stands for the arrangements' fasteners).
- b) The arrangements intended for the impact test were given the identification numbers 31416 B1-2, 31416 B3-4 and 31416 B5-6 (the numbers 1-2, 3-4 & 5-6 stands for the arrangements' fasteners).

4. (8.4) Characterization and condition of the test specimen and assembly

The received specimens and conductors were new and in good condition.

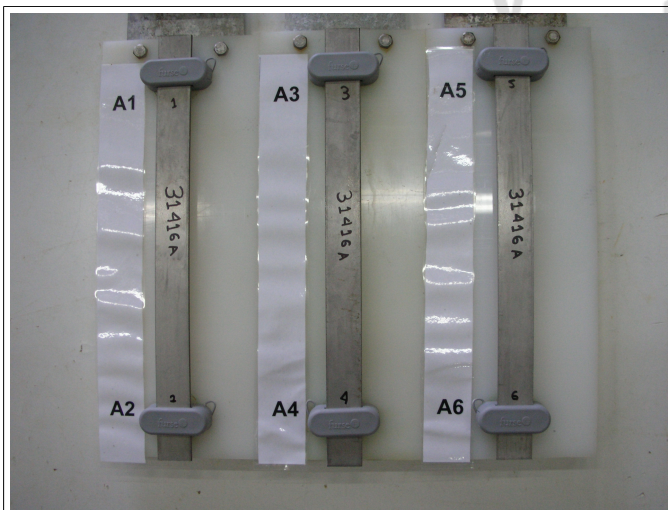
4.1 (8.4.1) Sampling procedure

Not relevant.

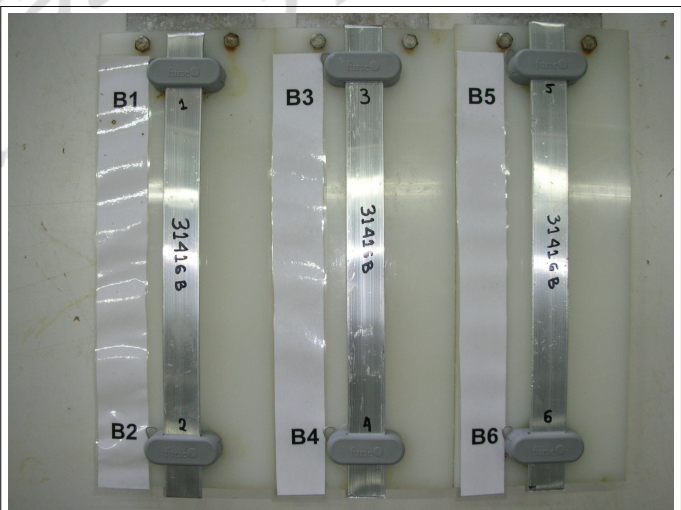
4.2 (8.4.2) Date of receipt of test specimens

2015/02/09

4.3 (8.4.3) Photographs



1a. Arrangements 31416 A



1b. Arrangements 31416 B

1. The assembled specimens before the initiation of the test sequence



2a. Arrangements 31416 A



2b. Arrangements 31416 B

2. The specimens after the environmental influence test



3a. Arrangements 31416 A



3b. Arrangements 31416 B

3. The specimens after the termination of the tests.

5. (8.5) Conductor

5.1 (8.5.1) Conductor material

Specimens A: Stainless steel (SSt).

Specimens B: Aluminium (Al).

5.2 (8.5.2) Nominal cross-section area, dimensions and shape

Specimens A & B: 75mm² nominal cross section area, solid rectangular tape.

6. (8.6) Standards and references

6.1 (8.6.1) Test standard used

IEC / BS EN 62561-4:2011

“Lightning protection system components (LPSC) – Part 4: Requirements for conductor fasteners”.

6.2 (8.6.2) Reference to the above standard

Reference to the above standard can be made because the specimens subjected to the full set of the required tests, which are reported in clause 10.

6.3 (8.6.3) Other relevant documentation

- IEC EN 62305-3:2012 “Protection against lightning – Part 3: Physical damage to structures and life hazards”.
- Furse, Thomas & Betts, Total Solution Product Catalogue, as downloaded from the website of Thomas & Betts, www.tnb.com in March 2014.

7. (8.7) Test procedure

7.1 (8.7.1) Description of the test procedure

According to IEC / BS EN 62561-4:2011 the following tests were performed:

- Environmental influence test as per clause 6.3 of the standard.
- Resistance to mechanical effects as per clause 6.4 of the standard.
- Inspection on installation instructions literature as per clause 6.5 of the standard.
- Marking test as per clause 6.6 of the standard.
- Inspection on construction as per clause 6.7 of the standard.

The specimens were assembled by two on insulating plates, using stainless steel (SSt) solid tape conductor 25x3 mm (arrangements intended for the lateral load test) and aluminium (Al) solid tape conductor 25x3 mm (arrangements intended for the impact test).

The tests were performed according the standard IEC / BS EN 62561-4:2011. Requirements and results are illustrated in detail in clause 10 “Results and parameters recorded” of the present report.

7.2 (8.7.2) Justification for any deviations from, additions to or exclusions from the referenced standard

There were no deviations from, additions to or exclusions from the referenced standard.

7.3 (8.7.3) Other informations relevant to the tests

All information is tabled in clause 10 of this report.

7.4 (8.7.4) Configuration of the testing assembly

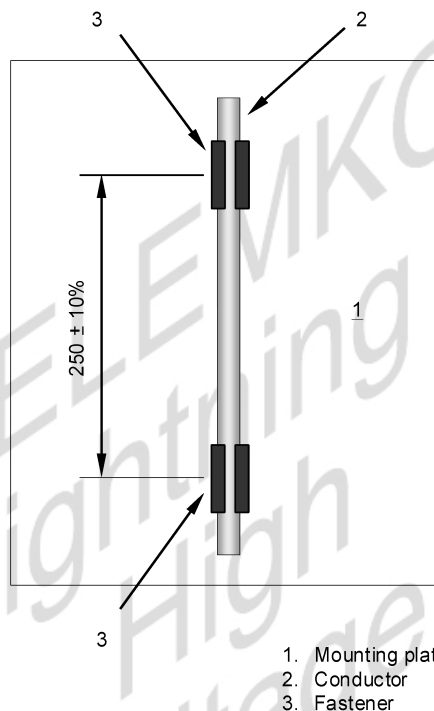


Figure 1 : Configuration of the testing assembly

7.5 (8.7.5) Location of the arrangement in the testing area

The tests were performed in our laboratory's "conditioning test room".

8. (8.8) Testing equipment description

1. Fluorescent UV exposure chamber, serial nr. HEA PG/211111.
2. Cooling – heating chamber, serial nr MX904–050110.
3. 15kg weights.
4. 5kg weights.
5. Impact test apparatus (2J, 0,5kg, 400mm)



Fluorescent UV exposure chamber.



Cooling – heating chamber

9. (8.10) Results and parameters recorded

9.1 (8.10.1–8.10.2–8.10.3) Tables of results and parameters observed or derived, required passing criteria

Requirements and passing criteria according to IEC / BS EN 62561-4:2011	Recorded results and parameters	PASS/ FAIL
<p><u>Environmental influence test (see 6.3.3 of the standard)</u></p> <p>All the arrangements shall be subjected to the following environmental test:</p> <ul style="list-style-type: none"> Exposure to fluorescent UV, in accordance with EN ISO 4892-3. Continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of (360±1)min consisting of a (300±1)min light exposure and a (60±1)min exposure to water spray with light as described in table 4, Method A, cycle 3 of the standard. <p>The specimens are deemed to have passed the environmental influence tests if they show no sign of disintegration and no cracks visible to normal or corrected vision.</p> <p><u>Note: The laboratory is not accredited for this test</u></p>	<p><u>Environmental test:</u></p> <p>All the arrangements (31416 A1-2, 31416 A3-4, 31416 A5-6, 31416 B1-2, 31416 B3-4 & 31416 B5-6) were subjected to the tests as follows:</p> <p>- Exposure to fluorescent UV for 963 h</p> <p>After the tests, none of the conductors or metal parts of conductor fasteners exhibited any corrosive deterioration and the plastic parts of all the fasteners show no sign of disintegration and no cracks visible to normal or corrected vision.</p>	PASS
<p><u>Resistance to mechanical effects, lateral load test at –10°C (see 6.4.1 of the standard)</u></p> <p>After the environmental tests a first set of three arrangements of specimens shall be subjected to a load test of 200N applied in the mid distance between the conductor fasteners. The full test load shall be applied for period of 60 min to 61 min. The test shall be carried out at the temperature of –10±1°C.</p> <p>The specimens are deemed to have passed the tests provided the fasteners remain intact and the conductor is still located within the fasteners.</p>	<p><u>Lateral load test at –10°C:</u></p> <p>The test was carried out on the arrangements 31416 A1-2, 31416 A3-4 & 31416 A5-6, at temperatures: –10,3°C ÷ –9,4°C for a period of 61 min.</p> <p>After the test all the fasteners remain intact and all the conductors were still located within the fasteners.</p>	PASS
<p><u>Resistance to mechanical effects, lateral load test at +40°C (see 6.4.1 of the standard)</u></p> <p>The same set of three arrangements of specimens shall be subjected to a second load test of 200N applied in the mid distance between the conductor fasteners. The second test shall be carried out at the temperature of +40±4°C and the full test load shall be applied for period of 60 min to 61 min.</p> <p>The specimens are deemed to have passed the tests provided the fasteners remain intact and the conductor is still located within the fasteners.</p>	<p><u>Lateral load test at +40°C:</u></p> <p>The test was carried out on the arrangements 31416 A1-2, 31416 A3-4 & 31416 A5-6, at temperatures: +39,6°C ÷ +40,3°C for a period of 61 min.</p> <p>After the test all the fasteners remain intact and all the conductors were still located within the fasteners.</p>	PASS

Requirements and passing criteria according to IEC / BS EN 62561-4:2011	Recorded results and parameters	PASS/ FAIL
<p><u>Impact test (see 6.4.3 of the standard)</u></p> <p>A second set of three arrangements of specimens shall be subjected to an impact test. The third set of arrangements of specimens shall be placed in a cabinet at a temperature -5°C. After 2h, the arrangement shall be removed from the cabinet and immediately placed in position in an impact test apparatus according to Clause 4 of EN 60068-2-75:1997. At $(12\pm 2)\text{s}$ after the removal of the arrangement from the cabinet the hammer shall be allowed to fall (2J, 0,5kg, 400mm) so that three impacts (the first impact to the left fastener, the second to the other fastener and the third to the middle length of the arrangement) shall be applied as far as possible perpendicular to the length of the arrangement.</p> <p>After the test the specimens shall show no cracks or similar damage visible to normal or corrected vision without magnification and the conductor is still located within the fasteners.</p>	<p><u>Impact test:</u></p> <p>The test was carried out on the arrangements 31416 B1-2, 31416 B3-4 & 31416 B5-6, at temperatures: $-5,6^{\circ}\text{C} \div -4,4^{\circ}\text{C}$ for a period of 2 h.</p> <p>After the test:</p> <ul style="list-style-type: none"> - all the fasteners show no cracks or similar damage visible to normal or corrected vision without magnification; - all the conductors were still located within the fasteners. 	PASS
<p><u>Installation instructions (see 6.5 of the standard)</u></p> <p>The installation instructions must contain:</p> <ul style="list-style-type: none"> - The classifications; - The maximum and the minimum conductor dimensions; - Materials of conductors to be used; - The type of mounting surface to be fixed; - The recommended method of assembly, installation and fixing to the mounting surface; - The lateral load. 	<p><u>The installation instructions contains:</u></p> <ul style="list-style-type: none"> - The classifications; - The max and the min conductor dimensions; - Materials of conductors to be used; - The type of mounting surface to be fixed; - The recommended method of assembly, installation and fixing to the mounting surface; - The lateral load. 	PASS
<p><u>Marking test (see 5.5 & 6.6 of the standard)</u></p> <p>Each conductor fastener shall be marked with:</p> <ul style="list-style-type: none"> - the manufacturer's or responsible vendor's name, logo or trademark; - the product identification or type. <p>Marking on the product shall be durable and easily legible.</p> <p>Compliance is checked by inspection and by rubbing the marking by hand for 15 sec with a piece of cloth soaked in water and again for 15 sec with a piece of cloth soaked with white spirit.</p> <p>The specimens are deemed to have passed the test if the marking remains legible.</p> <p>Note 1: Where it is not possible to make these marks directly onto the product, they shall be on the smallest supplied packaging.</p> <p>Note 2: Marking made by moulding, pressing or engraving is not subjected to this test.</p>	<p><u>Marking test:</u></p> <p>The marking was made by moulding. Therefore only the visual inspection has been performed.</p> <p>Each fastener was marked with the manufacturer's name and trademark.</p> <p>The product identification is given on the smallest supplied packaging.</p>	PASS
<p><u>Construction (see 6.7 of the standard)</u></p> <p>The surface of the specimens shall be free from burrs from cutting process, flash, moulding, joint deformation and similar inconsistencies which are likely to damage the conductors or inflict injury to the installer or user.</p>	<p><u>Construction:</u></p> <p>The surface of the fasteners was free from burrs from cutting process, flash, moulding, joint deformation.</p>	PASS

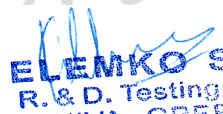
9.2 (8.10.4) Summary statement

Twelve specimens of polypropylene fastener part number CP020, which are classified according to IEC / BS EN 62561-4:2011 as:

- non-metallic as per subclause 4a;
- without screws as per subclause 4b;
- to allow axial movement of the conductor as per subclause 4c;

were submitted for testing by FURSE and have been subjected to all the applicable tests required by the Standard IEC / BS EN 62561-4:2011 which are mentioned in the clauses 6.3.3, 6.4.1, 6.4.3, 6.5, 6.6 & 6.7 of the standard and found that :

The above twelve specimens have successfully passed the tests and therefore they satisfy the criteria according to IEC / BS EN 62561-4:2011 for use in Lightning Protection Systems (LPS), for clamping solid bare tape conductor 25x3 mm dimensions.

	Laboratory Technical Director
NAME	Dr. N. Kokkinos Electrical Engineer BEng, MSc, PhD
SIGNATURE	 ELEMKO S.A. R. & D. Testing Lab. THIVA - GREECE TEL: +30 210 2845400 e-mail: elemko@elemko.gr

NOTE: This type test report only covers the specimens submitted for test and does not produce evidence for the quality for series production.

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