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|   | COMBUSTION PROCESSES AND EXPLOSIONS LABORATORY BW |  |
| | NOTIFIED BODY No. 1438 SCIENTIFIC AND RESEARCH CENTRE FOR FIRE PROTECTION named after Józef Tuliszkowski – National Research Institute | |
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TEST REPORT No. 229/BW/17

Number of pages: 9

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| CUSTOMER Name and address | Kabeltec GmbH Werkstr. 43 78727 Oberndorf, Germany |
| DESCRIPTION AND IDENTIFICATION OF TESTED PRODUCT SAMPLE | FLEX-JZ/OZ and FLEX-JB/OB LIYCY FLEX-SY-JZ/OZ FLEX-CY-JZ/OZ 2YSLCY-J and 2XSLCMK |
| PRODUCT MANUFACTURER Name and address | Kabeltec GmbH Werkstr. 43 78727 Oberndorf, Germany |

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| Report copy no. | 1/3 |
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Z-ca Dyrektora
ds. Badań i Rozwoju
mgr Sylwia Krawczyńska

Józefów, June 28th, 2017



1. FORMAL BASIS FOR TESTING

Commissioning letter dated 23.05.2017 r. L.dz. 3739,
Agreement no. 229/BW/17 dated 25.05.2017

2. TESTED PRODUCT SAMPLES

2.1. Name of product, type, dimensions and other markings

| Lp. | Name of product, type | Type |
|-----|----------------------------|---------|
| 1. | Flex-JZ/OZ 300/500V 3x0.75 | control |
| 2. | Flex-JB/OB 300/500V 4x95 | control |
| 3. | LIYCY 300/500V 3x0.75 | control |
| 4. | LIYCY 300/500V 25x1.5 | control |
| 5. | FLEX-SY-JZ 300/500V 5x1.5 | control |
| 6. | FLEX-SY-JB 300/500V 4x95 | control |
| 7. | FLEX-CY-JZ 300/500V 3x1.5 | control |
| 8. | FLEX-CY-JB 300/500V 4x70 | control |
| 9. | 2YSLCYK-J 0.6/1kV 4x1.5 | control |
| 10. | 2XSLCMK 0.6/1kV 3x185+3G35 | control |

2.2. General technical description of the product

| Lp. | General technical description of the product |
|-----|---|
| 1 | FLEX-JZ/OZ, FLEX-JB/OB, FLEX-JZ POWER and LIYY 300/500V Control cable is constructed of: <ul style="list-style-type: none"> - Copper conductor, class 5 according VDE 0295, - PVC conductor insulation black, - Earth conductor green/yellow in other layer, - PVC outer sheath, Design standard: Not indicated |
| | LIYCY 300/500V Control cable is constructed of: <ul style="list-style-type: none"> - Copper conductor class 5 according to VDE 0295, - PVC core insulation, - Cores twisted into layers, - Foil wrapping, - Overall screen of tinned cooper wires, - PVC outer sheath, Design standard: Not indicated |
| 3 | FLEX-SY-JZ/OZ and FLEX-SY-JB/OB 300/500V Control cable is constructed of: <ul style="list-style-type: none"> - Copper conductor class 5 according to VDE 0295 - PVC core insulation, - Cores twisted into layers, - PVC inner sheath, - Overall screen made of galvanized steel wire, - PVC outer sheath Design standard: Not indicated |
| | |



| | |
|----------|--|
| 4 | <p>FLEX-CY-JZ/OZ and FLEX-CY-JB/OB 300/500V</p> <p>Control cable is constructed of:</p> <ul style="list-style-type: none"> - Copper conductor class 5 according to VDE 0295, - PVC core insulation, - PVC inner sheath, - Overall screen made of tinned copper wire braid, coverage approximately 85%, - PVC outer sheath <p>Design standard: Not indicated</p> |
| 5 | <p>2YSLCY-J/2YSLCYK-J EMC + Schwarz and 2YSLCY-J 3 PLUS EMV 0.6/1kV</p> <p>Control cable is constructed of:</p> <ul style="list-style-type: none"> - Copper conductor class 5 according to VDE 0295, - PE core insulation, - Cores twisted in layers (only for 2YSLCY-J/2YSLCYK-J EMC+ Schwarz), - Concentric twisted cores – splitted green and yellow earth conductor (only for 2YSLCY-J 3 PLUS EMV), - Aluminum foil screen, - Tinned copper braided screening, - PVC outersheath <p>Design standard: Not indicated</p> |

2.3. Procedure of sampling/receipt and storage of test items

| No. | Name of product | Sampling and acceptance | Date |
|-----|----------------------------|---------------------------|------------|
| 1 | Flex-JZ/OZ 300/500V 3x0.75 | By customer and delivered | 02.06.2017 |
| 2 | Flex-JB/OB 300/500V 4x95 | By customer and delivered | 02.06.2017 |
| 3 | LIYCY 300/500V 3x0.75 | By customer and delivered | 02.06.2017 |
| 4 | LIYCY 300/500V 25x1.5 | By customer and delivered | 02.06.2017 |
| 5 | FLEX-SY-JZ 300/500V 5x1.5 | By customer and delivered | 02.06.2017 |
| 6 | FLEX-SY-JB 300/500V 4x95 | By customer and delivered | 02.06.2017 |
| 7 | FLEX-CY-JZ 300/500V 3x1.5 | By customer and delivered | 02.06.2017 |
| 8 | FLEX-CY-JB 300/500V 4x70 | By customer and delivered | 02.06.2017 |
| 9 | 2YSLCYK-J 0.6/1kV 4x1.5 | By customer and delivered | 02.06.2017 |
| 10 | 2XSLCMK 0.6/1kV 3x185+3G35 | By customer and delivered | 02.06.2017 |

On the day of delivery "Protocol of acceptance of test sample" was prepared. Samples before tests were stored in laboratory.



3. TEST AND TEST METHODS

3.1. Testing methods

| No. | Tested characteristic | Test method |
|-----|--|---------------------------------|
| 1. | Flame spread on single wire – distance of charring | PN-EN 60332-1-2:2010+A1:2016-02 |

3.2. Date of testing

| No. | Name of product | Date of test |
|-----|----------------------------|--------------|
| 1 | Flex-JZ/OZ 300/500V 3x0.75 | 22.06.2017 |
| 2 | Flex-JB/OB 300/500V 4x95 | 22.06.2017 |
| 3 | LIYCY 300/500V 3x0.75 | 22.06.2017 |
| 4 | LIYCY 300/500V 25x1.5 | 22.06.2017 |
| 5 | FLEX-SY-JZ 300/500V 5x1.5 | 22.06.2017 |
| 6 | FLEX-SY-JB 300/500V 4x95 | 22.06.2017 |
| 7 | FLEX-CY-JZ 300/500V 3x1.5 | 22.06.2017 |
| 8 | FLEX-CY-JB 300/500V 4x70 | 22.06.2017 |
| 9 | 2YSLCYK-J 0.6/1kV 4x1.5 | 22.06.2017 |
| 10 | 2XSLCMK 0.6/1kV 3x185+3G35 | 22.06.2017 |

4. TEST RESULTS

| <i>Parameter</i> | <i>Details</i> | |
|--|-------------------------------|----------------|
| Tested sample | Flex-JZ/OZ 300/500V 3x0.75 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 s | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 5.8 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 259 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 478 |
| Distance of charring | mm | 219 |



| <i>Parameter</i> | <i>Details</i> | |
|--|-----------------------------|-----------------------|
| Tested sample | Flex-JB/OB 300/500V 4x95 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 120 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 46.2 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 359 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 511 |
| Distance of charring | mm | 152 |

| <i>Parameter</i> | <i>Details</i> | |
|--|-----------------------|-----------------------|
| Tested sample | LIYCY 300/500V 3x0.75 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 5.7 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 262 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 489 |
| Distance of charring | mm | 227 |



| <i>Parameter</i> | <i>Details</i> | |
|--|-----------------------|-----------------------|
| Tested sample | LIYCY 300/500V 25x1.5 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 18.7 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 387 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 499 |
| Distance of charring | mm | 112 |

| <i>Parameter</i> | <i>Details</i> | |
|--|------------------------------|-----------------------|
| Tested sample | FLEX-SY-JZ 300/500V 5x1.5 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 11.0 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 374 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 506 |
| Distance of charring | mm | 132 |



| <i>Parameter</i> | <i>Details</i> | |
|--|-----------------------------|-----------------------|
| Tested sample | FLEX-SY-JB 300/500V 4x95 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 240 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 54.6 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 368 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 505 |
| Distance of charring | mm | 137 |

| <i>Parameter</i> | <i>Details</i> | |
|--|---------------------------------|-----------------------|
| Tested sample | FLEX-CY-JZ/OZ 300/500V 3x1.5 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 8.9 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 319 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 488 |
| Distance of charring | mm | 169 |



| Parameter | Details | |
|--|--------------------------------|----------------|
| Tested sample | FLEX-CY-JB/OB 300/500V 4x70 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 120 | |
| Wielkość | Jedn. | Wartość |
| Average outer diameter of 3 measurements | mm | 40.0 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 282 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 513 |
| Distance of charring | mm | 231 |

| Parameter | Details | |
|--|----------------------------|----------------|
| Tested sample | 2YSLCYK-J 0.6/1kV 4x1.5 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 60 | |
| Wielkość | Jedn. | Wartość |
| Average outer diameter of 3 measurements | mm | 11.9 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 386 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 495 |
| Distance of charring | mm | 109 |



| <i>Parameter</i> | <i>Details</i> | |
|--|-------------------------------|----------------|
| Tested sample | 2XSLCMK 0.6/1kV 3x185+3G35 | |
| Terms of conditioning | 23±5°C | |
| | 50±10% | |
| | 24 h | |
| The duration of test | 240 | |
| <i>Wielkość</i> | <i>Jedn.</i> | <i>Wartość</i> |
| Average outer diameter of 3 measurements | mm | 53.4 |
| The distance between the lower edge of the upper handle and the upper edge of charring | mm | 371 |
| The distance between the lower edge of the upper handle and lower ledge of charring | mm | 515 |
| Distance of charring | mm | 144 |

5. REPRESENTATIONS AND RESERVATIONS

Test results according to 60332-1-2:2010+A1:2016-02 refer to the behavior of samples for testing, in particular test conditions. They cannot be the sole criterion for assessing the potential fire hazard of the product used.

The test results refer only to the tested product sample / object of tests. Without the written permission of the Laboratory Department report must not be reproduced otherwise than in entire document. The test report has been prepared in three copies.

THE END OF REPORT

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|----------------------|---------------------------|---|
| Prepared by | MSc Eng. Piotr Kaczmarzyk | 28 th June 2017 <i>Piotr Kaczmarzyk</i> Date and signature |
| Authorised by | MSc Eng. Wojciech Klapsa | 28 th June 2017 <i>Wojciech Klapsa</i> Date and signature |