

## **TEST REPORT FIRES-FR-004-09-AUNE**

**Cable bearing system BAKS with TECHNOKABEL cables**



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**FIRES, s.r.o.**

Notifikovaná osoba č./ Notified Body No.: 1396

Autorizovaná osoba reg. č./Approved Body No.: SK01

Osloboditeľov 282, 059 35 Batizovce, Slovakia

Tel.+421 52 775 2298, Fax+421 52 7881412, e-mail: info@fires.sk, [www.fires.sk](http://www.fires.sk)

Reg. No. 041/S-159

Testing laboratory No. 041/S-159 accredited by  
Slovak national accreditation service

# TEST REPORT

Test report number: **FIRES-FR-004-09-AUNE**

Tested property: Function in fire

Test method: DIN 4102 – 12:1998-11

Date of issue: **25. 02. 2009**

Name of the product: Cable bearing system BAKS with TECHNOKABEL cables

Manufacturer: **BAKS Kazimierz Sielski**, ul. Jagodne 5,  
05-480 Karczew, Poland - producer of construction**TECHNOKABEL S.A.**, Nasielska 55,  
04-343 Warszawa, Poland – producer of cablesSponsor: **BAKS Kazimierz Sielski**, ul. Jagodne 5, 05-480 Karczew, Poland

Task No.: PR-08-0528

Specimen received: 09. 01. 2009

Date of the fire test: 16. 01. 2009

Technician responsible for the technical side of this report: Miroslav Hudák

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## 1. INTRODUCTION

This test report contains the results of the test carried out at the testing laboratory of FIRES s.r.o. in Batizovce. The purpose of the test was product classification. The test specimen was cable bearing system BAKS with power and communication non-halogen TECHNOKABEL cables with circuit integrity maintenance. Persons witnessing the test:

Representatives of the sponsor: Mr. Kliczek (BAKS)  
 Mr. Matysiak (BAKS)  
 Mr. Kwiatkowski (TECHNOKABEL)  
 Mr. Gosik (TECHNOKABEL)

Test directed by: Mr. Marek Gorlický  
 Test carried out by: Mr. Miroslav Hudák  
 Operator: Mr. Alexander Reľovský

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## 2. MEASURING EQUIPMENT

| Identification number                                                            | Measuring equipment                                                   | Note                                                                     |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------|
| F 90 002                                                                         | Horizontal test furnace for fire testing                              | -                                                                        |
| F 69 005                                                                         | PLC system for data acquisition and control<br>TECOMAT NS 950         | -                                                                        |
| F 40 008                                                                         | Software Control Web 2000                                             |                                                                          |
| F 40 009                                                                         | Control and communication software to PLC<br>TECOMAT NS 950           |                                                                          |
| F 40 010                                                                         | Visual and calculating software to PLC<br>TECOMAT NS 950              | -                                                                        |
| F 40 011                                                                         | Driver Tecomat – CW 2000 (software)                                   | -                                                                        |
| F 71 008, F 71 009                                                               | Transducer of differential pressure (from -50 to +150) Pa             | pressure inside the test furnace                                         |
| F 08 521, F 08 522, F 08 523, F 08 524<br>F 08 525, F 08 526, F 08 527, F 08 528 | Plate thermometers                                                    | temperature inside the test furnace, according to EN 1363-1 a DIN 4102-2 |
| F 08 701                                                                         | Sheathed thermocouple type K $\phi$ 3 mm                              | ambient temperature                                                      |
| F 69 009                                                                         | PLC system for data acquisition and climate control<br>TECOMAT TC 604 | climatic conditions                                                      |
| F 60 001 – F 60 009                                                              | Temperature and relative air humidity sensors                         | climatic conditions                                                      |
| F 54 057                                                                         | Racking meter                                                         | -                                                                        |
| F 57 007                                                                         | Digital stop-watch                                                    | -                                                                        |
| F 96 015                                                                         | Test signal panel                                                     | -                                                                        |

### 3. PREPARATION OF THE SPECIMEN

Testing laboratory didn't take off individual components of the specimen. Components take-off and its delivering to the testing laboratory were carried out by the test sponsor. Assembling of the supporting system into the test furnace was carried out by workers of the test sponsor. Mounting of cables and weights into the supporting system was carried out by workers businesses BAKS and TECHNOKABEL.

### 4. PREPARATION OF THE TEST

#### 4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing systems BAKS with accessories – trays, ladders, clips UDF, UEF, KSA, UKO1, sleeves – OZO and power and communication non-halogen cables business TECHNOKABEL S. A..

|         |                                     |          |
|---------|-------------------------------------|----------|
| Cables: | NHXH 4x1,5 RE FE180 PH30/E30        | ( 4 x )  |
|         | NHXH 4x50 RM FE180 PH30/E30         | ( 4 x )  |
|         | NHXCH 4x1,5/1,5 RE FE180 PH30/E30   | ( 4 x )  |
|         | NHXCH 4x50/25 RM FE180 PH30/E30     | ( 4 x )  |
|         | NHXH 4x1,5 RE FE180 PH90/E90        | ( 18 x ) |
|         | NHXH 4x16 RM FE180 PH90/E90         | ( 2 x )  |
|         | NHXH 4x50 RM FE180 PH90/E90         | ( 16 x ) |
|         | NHXCH 4x1,5/1,5 RE FE180 PH90/E90   | ( 10 x ) |
|         | NHXCH 4x16/16 RM FE180 PH90/E90     | ( 2 x )  |
|         | NHXCH 4x50/25 RM FE180 PH90/E90     | ( 10 x ) |
|         | HTKSH 1x2x0,8 FE180 PH90/E30-E90    | ( 20 x ) |
|         | HTKShekw 1x2x0,8 FE180 PH90/E30-E90 | ( 16 x ) |
|         | HDGszo 3x2,5 FE180 PH90/E30-E90     | ( 16 x ) |
|         | HDGsekwzo 3x2,5 FE180 PH90/E30-E90  | ( 16 x ) |

**Supporting system BAKS:** ceiling installation and five suspension tracks was used for specimen test.

**Ceiling installation:** was made by cable clips (type UDF, UEF, KSA), sleeves (type OZO) and ceiling ledges (type SDOC 400) which were fixed to ceiling by dowels (type SRO M6x30, GSO 6x40 and KWBO 6x40) in spacing of 300 mm and 600 mm. Cables were fixed to ledges by clips (type UKO1) in spacing of 600 mm. Cable clips (type UDF and UEF) were fixed in plastic ledge (producer Emitec) to ceiling by dowels (type SRO M6x30) in spacing of 300 mm. Cable clips were depending on the diameter of cables.

**Suspension track No. 1:** was made by three pair hangers (type UTMO) which were fixed to wall by dowels (type PSRO M8x75) in spacing of 1500 mm.

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed to hangers by screws M8 (type SGN M8x14). Cables were fixed to ladders by clips (type UKO1) in spacing of 600 mm.

**Suspension track No. 2:** was made of three consoles combined of two horizontal supports (type CWOP40H40/05E rustless) and two threaded bar (type PGM10/1x800E rustless) with washers and nuts M10 and two hangers (type WPOVE rustless) which were fixed to ceiling by dowels (type PSRO M10x80E rustless) in spacing of 1500 mm.

Trays (type KCOJ 400H60/3E rustless, steel sheet thickness 1,0 mm) were fixed at upper horizontal supports and jointed together by two junctions (type LPOPH60E) and by sheet (type BLO 400E) with screws M6 (type SGN M6x12/E). Trays were fixed to supports by screws M6 (type SGN M6x12/E).

Ladders (type DGOD 400H60/3E rustless, steel sheet thickness 1,2 mm, spacing of transoms 150 mm) were fixed at under horizontal supports and jointed together by junction (type LDOCH60E) with screws M8 (type SGN M8x14/E). Ladders were fixed to supports by clips (type ZMOE) with screws M8 (type SGN M8x14/E). Cables were fixed to trays by clips UDF and ladders by clips UKO1.

Suspension track No. 3: was made by three pair booms (type WMCO 300) which were fixed to ceiling by two dowels (type PSRO M10x80) in spacing of 1500 mm. Two hangers (type UTMO) were fixed by screws (type SGN M8x14) at each boom.

Ladders (type DUOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed at upper holders with screws M8 (type SGN M8x14).

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed at under holders with screws M8 (type SGN M8x14). Cables were fixed to ladders by clips UKO1.

Suspension track No. 4: was made by three hangers (type WPCO 800) which were fixed to ceiling by two dowels (type PSRO M10x80) in spacing of 1500 mm. Two booms (type WWSO 400) were fixed by screws (type SM M10x20) at each hanger. Holders (type UPWO) were fixed at the end of booms. Booms were fixed through these holders by threaded bar M10 with washers and nuts M10 to ceiling holder (type USOV) which was fixed to ceiling by dowel (type PSRO M10x80).

Trays (type KCOD 400H60/3N, steel sheet thickness 1,2 mm) were fixed at upper booms and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO400N) with screws M6 (type SGN M6x12). Trays were fixed to booms by screws M6 (type SGN M6x12).

Ladders (type DUOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) were fixed at under booms and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to booms by clips (type ZMO) with screws M8 (type SGN M8x14). Cables were fixed to trays by clips UDF and ladders by clips UKO1.

Suspension track No. 5: was made by three hangers (type WFLO 500) which were fixed to ceiling by two dowels (type PSRO M10x80) in spacing of 1500 mm. Three hangers (type WFLO 400) were fixed by screws (type SM M10x20) at each hanger. Ends of hangers were fixed by threaded bar M10 with washers and nuts M10 to ceiling by dowel (type TRSO M10).

Trays (type KCOD 400H60/3N, steel sheet thickness 1,2 mm) were fixed at upper hangers and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO400N) with screws M6 (type SGN M6x12). Trays were fixed to hangers by screws M6 (type SGN M6x12).

Ladders (type DUOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) were fixed at central hangers and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to hangers by clips (type ZMO) with screws M8 (type SGN M8x14).

Trays (type KCOD 400H60/3N, steel sheet thickness 1,2 mm) were fixed at under hangers and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO400N) with screws M6 (type SGN M6x12). Trays were fixed to hangers by screws M6 (type SGN M6x12). Cables were fixed to trays by clips UDF and ladders by clips UKO1.

Suspension track No. 6: was made by three pair hangers (type UTMO) which were fixed to wall by dowels (type PSRO M8x75) in spacing of 1500 mm.

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed to hangers by screws M8 (type SGN M8x14). Cables were fixed to ladders by clips (type UKO1) in spacing of 600 mm.

Trays were loaded with 10 kg/m and ladders were loaded with 20 kg/m.

Types of individual components are from catalogue BAKS.

Cable penetration through the wall of test furnace was sealed by mineral wool Rockwool.

Loading with steel chain were used as the equivalent load.

More detailed information about specimen construction is shown in the drawings which form the appendix of this test report. Drawings were delivered by the sponsor of the test.

All the information about technical specifications of used materials and semi-products, information about their type sign and their producers were delivered by sponsor. This information was not subject of the specimen inspection. Parameters which were checked are quoted in paragraph 4.3 SPECIMEN INSPECTION.

#### 4.2 DESCRIPTION OF THE SPECIMEN FIXATION

The test specimen was fixed on the ceiling of the test furnace which was created from concrete panels made of common shocked concrete of class B 20, 150 mm thick.

The type of specimen fixation into the test furnace is visible in drawing documentation and it was selected by the sponsor.

#### 4.3 SPECIMEN INSPECTION

Before and after the fire testing, conformity of the test specimen with drawing was checked. The specimen corresponded to the drawing which create appendix of this report.

Specimen inspection consisted of visual review of the test specimen as well as size verification (number and cross sections of conductors, thickness, measurements of cables and trays).

#### 4.4 CLIMATIC CONDITIONING

Test specimens were stored in the climatic hall and conditioned according to EN 1363-1 under the following climatic conditions:

| Relative air humidity [%] |                    | Ambient air temperature [°C] |                    |
|---------------------------|--------------------|------------------------------|--------------------|
| mean                      | standard deviation | mean                         | standard deviation |
| 50,7                      | 3,8                | 22,7                         | 0,8                |

The equilibrium state of test specimen humidity was not determined. The test specimen did not comprise hygroscopic material.

### 5. CARRYING OUT THE TEST

#### 5.1 TEST CONDITIONS

Conditions in the test furnace (temperature, pressure, content O<sub>2</sub> content) as well as conditions in the testing room (ambient temperature) corresponded to EN 1363-1 and DIN 4102-2 during the whole test. Detailed information is shown in appendices of this report or in quality records of the testing laboratory.

Values characterising environment in the testing room directly before the test:

| Date of fire test | Relative air humidity [%] | Ambient air temperature [°C] |
|-------------------|---------------------------|------------------------------|
| 16. 01. 2009      | 48,2                      | 13,4                         |

## 5.2 TEST RESULTS

The measured values are shown in tables that form an integral part of this test report.

## 5.3 EVALUATION OF THE TEST

| SPECIMENS                                             | Time to first failure/interruption of conductor |
|-------------------------------------------------------|-------------------------------------------------|
| Specimen 1: cables NHXCH 4x50/25 RM FE180 PH90/E90    | 90 minutes no failure/interruption              |
| Specimen 2: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90  | 90 minutes no failure/interruption              |
| Specimen 3: cables NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 4: cables NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 5: cable NHXH 4x1,5 RE FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 6: cable NHXH 4x1,5 RE FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 7: cable NHXH 4x50 RM FE180 PH90/E90         | 90 minutes no failure/interruption              |
| Specimen 8: cable NHXH 4x50 RM FE180 PH90/E90         | 90 minutes no failure/interruption              |
| Specimen 9: cable NHXCH 4x50/25 RM FE180 PH90/E90     | 90 minutes no failure/interruption              |
| Specimen 10: cable NHXCH 4x50/25 RM FE180 PH90/E90    | 90 minutes no failure/interruption              |
| Specimen 11: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 12: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 13: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 14: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 15: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | 90 minutes no failure/interruption              |
| Specimen 16: cables NHXCH 4x50/25 RM FE180 PH90/E90   | 90 minutes no failure/interruption              |
| Specimen 17: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 | 90 minutes no failure/interruption              |
| Specimen 18: cables NHXH 4x1,5 RE FE180 PH30/E30      | 23 minutes                                      |
| Specimen 19: cables NHXCH 4x50/25 RM FE180 PH30/E30   | 71 minutes                                      |
| Specimen 20: cables NHXH 4x50 RM FE180 PH30/E30       | 18 minutes                                      |
| Specimen 21: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | 90 minutes no failure/interruption              |
| Specimen 22: cables NHXCH 4x50/25 RM FE180 PH90/E90   | 90 minutes no failure/interruption              |
| Specimen 23: cables NHXH 4x50 RM FE180 PH30/E30       | 59 minutes                                      |
| Specimen 24: cable NHXCH 4x50/25 RM FE180 PH90/E90    | 90 minutes no failure/interruption              |
| Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90    | 90 minutes no failure/interruption              |
| Specimen 26: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  | 90 minutes no failure/interruption              |
| Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  | 90 minutes no failure/interruption              |
| Specimen 28: cables NHXH 4x50 RM FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 29: cables NHXH 4x1,5 RE FE180 PH90/E90      | 90 minutes no failure/interruption              |
| Specimen 30: cables NHXH 4x1,5 RE FE180 PH90/E90      | 90 minutes no failure/interruption              |
| Specimen 31: cables NHXH 4x50 RM FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 32: cables NHXH 4x1,5 RE FE180 PH90/E90      | 90 minutes no failure/interruption              |
| Specimen 33: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | 90 minutes no failure/interruption              |
| Specimen 34: cables NHXCH 4x16/16 RM FE180 PH90/E90   | 90 minutes no failure/interruption              |
| Specimen 35: cables NHXH 4x16 RM FE180 PH90/E90       | 80 minutes                                      |
| Specimen 36: cables (N)HXH 1x50 RM FE180 PH90/E90     | 28 minutes                                      |
| Specimen 37: cables NHXH 4x1,5 RE FE180 PH30/E30      | 90 minutes no failure/interruption              |
| Specimen 38: cables NHXCH 4x50/25 RM FE180 PH30/E30   | 81 minutes                                      |
| Specimen 39: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 | 90 minutes no failure/interruption              |
| Specimen 40: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 41: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 42: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 43: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 44: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 45: cable NHXH 4x50 RM FE180 PH90/E90        | 90 minutes no failure/interruption              |
| Specimen 46: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 47: cable NHXH 4x1,5 RE FE180 PH90/E90       | 90 minutes no failure/interruption              |
| Specimen 48: cables NHXH 4x50 RM FE180 PH90/E90       | 65 minutes                                      |
| Specimen 49: cables NHXH 4x1,5 RE FE180 PH90/E90      | 90 minutes no failure/interruption              |
| Specimen 50: cables (N)HXH 1x50 RM FE180 PH90/E90     | 57 minutes                                      |
| Specimen 51: cables (N)HXH 1x50 RM FE180 PH90/E90     | 90 minutes no failure/interruption              |

| <b>SPECIMENS</b>                                         | <b>Time to first failure/interruption of conductor</b> |
|----------------------------------------------------------|--------------------------------------------------------|
| Specimen 52A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 52B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 53A: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 53B: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 54A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | <b>90 minutes no failure/interruption</b>              |
| Specimen 54B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | <b>90 minutes no failure/interruption</b>              |
| Specimen 55A: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 55B: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 56A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 56B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 57A: cable HDGsekwz0 3x2,5 FE180 PH90/E30-E90   | <b>24 minutes</b>                                      |
| Specimen 57B: cable HDGsekwz0 3x2,5 FE180 PH90/E30-E90   | <b>36 minutes</b>                                      |
| Specimen 58A: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 58B: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 59A: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 59B: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 60A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 60B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 61A: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 61B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | <b>90 minutes no failure/interruption</b>              |
| Specimen 62A: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 62B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | <b>90 minutes no failure/interruption</b>              |
| Specimen 63A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | <b>90 minutes no failure/interruption</b>              |
| Specimen 63B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | <b>90 minutes no failure/interruption</b>              |
| Specimen 64A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | <b>90 minutes no failure/interruption</b>              |
| Specimen 64B: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 65A: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 65B: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 66A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 66B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 67A: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 67B: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 68A: cable HDGsekwz0 3x2,5 FE180 PH90/E30-E90   | <b>90 minutes no failure/interruption</b>              |
| Specimen 68B: cable HDGsekwz0 3x2,5 FE180 PH90/E30-E90   | <b>47 minutes</b>                                      |
| Specimen 69A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 69B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 70A: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 70B: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 71A: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 71B: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | <b>49 minutes</b>                                      |
| Specimen 72A: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | <b>90 minutes no failure/interruption</b>              |
| Specimen 72B: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 73A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | <b>90 minutes no failure/interruption</b>              |
| Specimen 73B: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 74A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 74B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90     | <b>90 minutes no failure/interruption</b>              |
| Specimen 75A: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |
| Specimen 75B: cable HDGsz0 3x2,5 FE180 PH90/E30-E90      | <b>90 minutes no failure/interruption</b>              |

The fire test was discontinued in 96<sup>th</sup> minute at the request of sponsor.

Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.  
Specimens S52 – S75 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

## 6. CLOSING

- This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in EN 1363-1 and DIN 4102 – 12:1998-11. Any significant deviation with respect to size, constructional details, loads, stresses, edges or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.
- Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.
- The test results refer only to the tested subjects. This test report is not an approval of the tested product by the test laboratory or the accreditation body overseeing the laboratory's activities. The test was carried out on testing equipment that is the property of FIRES Ltd. Without the written permission of the test laboratory this test report may be copied and/or distributed only as the whole. Any modifications of the test report can be made only by the fire resistance test laboratory FIRES Ltd. Batizovce.

**Report checked by:** Ing. Štefan Rástocký

**Issued by:**

  
Ing. Štefan Rástocký  
leader of the testing laboratory



**Responsible for the technical side of this report:**

  
Miroslav Hudák  
technician of the testing laboratory

## 7. NORMATIVE REFERENCES

|                       |                                                                                  |
|-----------------------|----------------------------------------------------------------------------------|
| DIN 4102 – 2:1977-09  | Fire behaviour of building materials and elements - requirements and testing     |
| DIN 4102 – 12:1998-11 | Fire resistance of electric cable systems required to maintain circuit integrity |
| STN EN 1363-1:2001    | Fire resistance tests – Part 1: General requirements                             |

## 8. LIST OF APPENDICES

|                  |                                                    |
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| Appendix 1       | Measured values inside the test furnace            |
| Appendix 2       | Measured values inside the test furnace / graph    |
| Appendix 3       | Measured times of tested specimens from S1 to S8   |
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| Appendix 5       | Measured times of tested specimens from S17 to S24 |
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### Measured values inside the test furnace

| Time<br>t [min] | Temperature [°C] |        |        |        |        |        |        |       |        |        |      | Deviation<br>d <sub>e</sub> [%] | Pressure<br>p [Pa] |
|-----------------|------------------|--------|--------|--------|--------|--------|--------|-------|--------|--------|------|---------------------------------|--------------------|
|                 | Td1              | Td2    | Td3    | Td4    | Td5    | Td6    | Td7    | Td8   | Tave   | Tn     | To   |                                 |                    |
| 0               | 50,9             | 16,7   | 15,8   | 20,3   | 16,8   | 12,8   | 16,9   | 29,6  | 22,5   | 20,0   | 14,4 | 0,0                             | 7,7                |
| 5               | 523,5            | 559,1  | 585,8  | 537,4  | 504,0  | 542,3  | 565,0  | 543,7 | 545,1  | 576,2  | 14,2 | -10,2                           | 11,1               |
| 10              | 713,1            | 686,3  | 669,7  | 610,8  | 739,4  | 721,8  | 679,4  | 638,7 | 682,4  | 678,4  | 13,7 | -4,7                            | 14,2               |
| 15              | 745,0            | 742,2  | 721,0  | 644,4  | 801,9  | 779,8  | 716,2  | 698,4 | 731,1  | 738,5  | 12,9 | -3,4                            | 15,5               |
| 20              | 750,9            | 780,6  | 776,5  | 703,7  | 870,3  | 860,2  | 828,5  | 816,4 | 798,4  | 781,4  | 12,9 | -2,8                            | 16,4               |
| 25              | 780,8            | 821,0  | 803,9  | 767,7  | 900,9  | 893,8  | 853,6  | 849,5 | 833,9  | 814,6  | 13,0 | -1,7                            | 16,7               |
| 30              | 813,5            | 869,3  | 869,8  | 833,1  | 859,7  | 865,0  | 830,4  | 793,8 | 841,8  | 841,8  | 12,8 | -1,2                            | 14,7               |
| 35              | 815,7            | 846,4  | 843,4  | 784,7  | 921,1  | 912,0  | 875,4  | 856,0 | 856,8  | 864,8  | 12,6 | -1,1                            | 15,8               |
| 40              | 829,1            | 872,6  | 876,3  | 826,2  | 920,2  | 918,0  | 884,3  | 875,5 | 875,3  | 884,7  | 12,6 | -1,0                            | 16,3               |
| 45              | 864,8            | 909,8  | 908,5  | 870,9  | 894,2  | 891,1  | 878,1  | 850,7 | 883,5  | 902,3  | 12,7 | -1,1                            | 16,5               |
| 50              | 832,2            | 877,2  | 891,4  | 900,1  | 866,3  | 880,8  | 924,5  | 937,3 | 888,7  | 918,1  | 12,9 | -1,3                            | 15,4               |
| 55              | 842,7            | 891,3  | 915,4  | 917,2  | 873,2  | 891,2  | 914,1  | 917,8 | 895,4  | 932,3  | 12,9 | -1,5                            | 15,5               |
| 60              | 874,3            | 929,9  | 948,8  | 942,3  | 906,1  | 933,4  | 948,9  | 953,6 | 929,7  | 945,3  | 12,9 | -1,5                            | 15,7               |
| 65              | 898,4            | 950,6  | 960,2  | 946,7  | 939,6  | 960,8  | 957,0  | 953,9 | 945,9  | 957,3  | 12,7 | -1,5                            | 16,4               |
| 70              | 911,7            | 964,9  | 972,9  | 961,9  | 966,7  | 989,5  | 980,3  | 957,5 | 963,2  | 968,4  | 12,9 | -1,4                            | 14,6               |
| 75              | 918,9            | 969,8  | 981,2  | 974,6  | 959,9  | 979,7  | 986,1  | 984,2 | 969,3  | 978,7  | 12,9 | -1,4                            | 13,1               |
| 80              | 929,2            | 979,9  | 989,9  | 984,5  | 976,2  | 992,2  | 994,0  | 977,0 | 977,9  | 988,4  | 12,7 | -1,3                            | 13,1               |
| 85              | 944,9            | 994,0  | 1002,0 | 1002,0 | 990,0  | 1005,0 | 1008,0 | 986,8 | 991,9  | 997,4  | 12,7 | -1,3                            | 11,4               |
| 90              | 956,5            | 1003,0 | 1011,0 | 1009,0 | 1001,0 | 1018,0 | 1016,0 | 996,6 | 1001,8 | 1005,9 | 12,8 | -1,2                            | 11,6               |
| 91              | 957,0            | 1002,0 | 1008,0 | 1004,0 | 1001,0 | 1017,0 | 1015,0 | 995,5 | 1000,1 | 1007,6 | 12,7 | -1,2                            | 11,2               |
| 92              | 955,5            | 1001,0 | 1010,0 | 1008,0 | 998,2  | 1013,0 | 1013,0 | 997,6 | 999,8  | 1009,2 | 12,9 | -1,2                            | 11,1               |
| 93              | 942,1            | 996,5  | 994,8  | 1001,0 | 983,4  | 998,4  | 998,6  | 992,8 | 988,6  | 1010,8 | 13,0 | -1,2                            | 11,1               |

**Tave** Average temperature in the test furnace calculated from plate thermometers

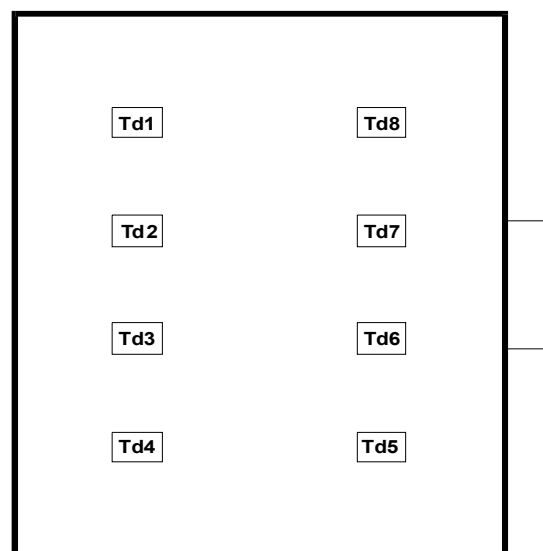
**Tn** Standard temperature in the test furnace laid down to test guideline

**To** Ambient temperature

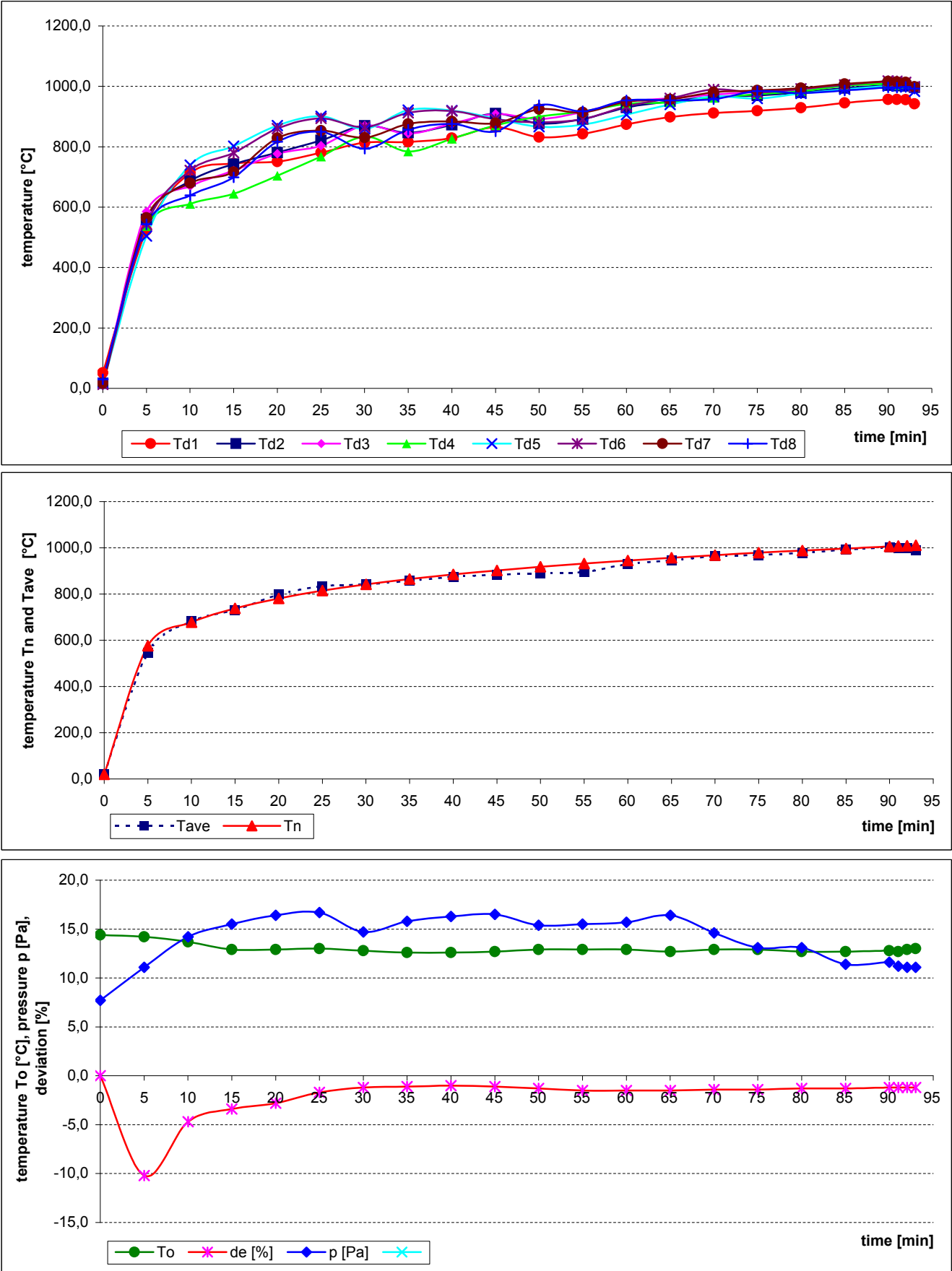
**d<sub>e</sub>** Deviation of the average temperature from the standard temperature calculated according to test guideline

**p** Pressure inside the test furnace measured under the ceiling of the test furnace

**Layout of measuring points in the test furnace:**



Measured values inside the test furnace / graph



**Measured time of tested specimens from S1 to S8**

| Specimen | Bulbs  | Time to permanent failure / interruption<br>[min:s] |
|----------|--------|-----------------------------------------------------|
| S1       | 1-L1   | no failure / interruption                           |
|          | 2-L2   | no failure / interruption                           |
|          | 3-L3   | no failure / interruption                           |
|          | 4-PEN  | no failure / interruption                           |
| S2       | 5-L1   | no failure / interruption                           |
|          | 6-L2   | no failure / interruption                           |
|          | 7-L3   | no failure / interruption                           |
|          | 8-PEN  | no failure / interruption                           |
| S3       | 9-L1   | no failure / interruption                           |
|          | 10-L2  | no failure / interruption                           |
|          | 11-L3  | no failure / interruption                           |
|          | 12-PEN | no failure / interruption                           |
| S4       | 13-L1  | no failure / interruption                           |
|          | 14-L2  | no failure / interruption                           |
|          | 15-L3  | no failure / interruption                           |
|          | 16-PEN | no failure / interruption                           |
| S5       | 17-L1  | no failure / interruption                           |
|          | 18-L2  | no failure / interruption                           |
|          | 19-L3  | no failure / interruption                           |
|          | 20-PEN | no failure / interruption                           |
| S6       | 21-L1  | no failure / interruption                           |
|          | 22-L2  | no failure / interruption                           |
|          | 23-L3  | no failure / interruption                           |
|          | 24-PEN | no failure / interruption                           |
| S7       | 25-L1  | no failure / interruption                           |
|          | 26-L2  | no failure / interruption                           |
|          | 27-L3  | no failure / interruption                           |
|          | 28-PEN | no failure / interruption                           |
| S8       | 29-L1  | no failure / interruption                           |
|          | 30-L2  | no failure / interruption                           |
|          | 31-L3  | no failure / interruption                           |
|          | 32-PEN | no failure / interruption                           |

|                                                      |
|------------------------------------------------------|
| Specimen 1: cables NHXCH 4x50/25 RM FE180 PH90/E90   |
| Specimen 2: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 |
| Specimen 3: cables NHXH 4x50 RM FE180 PH90/E90       |
| Specimen 4: cables NHXH 4x1,5 RE FE180 PH90/E90      |
| Specimen 5: cable NHXH 4x1,5 RE FE180 PH90/E90       |
| Specimen 6: cable NHXH 4x1,5 RE FE180 PH90/E90       |
| Specimen 7: cable NHXH 4x50 RM FE180 PH90/E90        |
| Specimen 8: cable NHXH 4x50 RM FE180 PH90/E90        |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S9 to S16**

| Specimen | Bulbs  | Time to permanent failure / interruption [min:s] |
|----------|--------|--------------------------------------------------|
| S9       | 33-L1  | no failure / interruption                        |
|          | 34-L2  | no failure / interruption                        |
|          | 35-L3  | no failure / interruption                        |
|          | 36-PEN | no failure / interruption                        |
| S10      | 37-L1  | no failure / interruption                        |
|          | 38-L2  | no failure / interruption                        |
|          | 39-L3  | no failure / interruption                        |
|          | 40-PEN | no failure / interruption                        |
| S11      | 41-L1  | no failure / interruption                        |
|          | 42-L2  | no failure / interruption                        |
|          | 43-L3  | no failure / interruption                        |
|          | 44-PEN | no failure / interruption                        |
| S12      | 45-L1  | no failure / interruption                        |
|          | 46-L2  | no failure / interruption                        |
|          | 47-L3  | no failure / interruption                        |
|          | 48-PEN | no failure / interruption                        |
| S13      | 49-L1  | no failure / interruption                        |
|          | 50-L2  | no failure / interruption                        |
|          | 51-L3  | no failure / interruption                        |
|          | 52-PEN | no failure / interruption                        |
| S14      | 53-L1  | no failure / interruption                        |
|          | 54-L2  | no failure / interruption                        |
|          | 55-L3  | no failure / interruption                        |
|          | 56-PEN | no failure / interruption                        |
| S15      | 57-L1  | no failure / interruption                        |
|          | 58-L2  | no failure / interruption                        |
|          | 59-L3  | no failure / interruption                        |
|          | 60-PEN | no failure / interruption                        |
| S16      | 61-L1  | no failure / interruption                        |
|          | 62-L2  | no failure / interruption                        |
|          | 63-L3  | no failure / interruption                        |
|          | 64-PEN | no failure / interruption                        |

|                                                       |
|-------------------------------------------------------|
| Specimen 9: cable NHXCH 4x50/25 RM FE180 PH90/E90     |
| Specimen 10: cable NHXCH 4x50/25 RM FE180 PH90/E90    |
| Specimen 11: cable NHXH 4x50 RM FE180 PH90/E90        |
| Specimen 12: cable NHXH 4x50 RM FE180 PH90/E90        |
| Specimen 13: cable NHXH 4x1,5 RE FE180 PH90/E90       |
| Specimen 14: cable NHXH 4x1,5 RE FE180 PH90/E90       |
| Specimen 15: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 |
| Specimen 16: cables NHXCH 4x50/25 RM FE180 PH90/E90   |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S17 to S24**

| Specimen | Bulbs  | Time to permanent failure / interruption [min:s] |
|----------|--------|--------------------------------------------------|
| S17      | 65-L1  | no failure / interruption                        |
|          | 66-L2  | no failure / interruption                        |
|          | 67-L3  | no failure / interruption                        |
|          | 68-PEN | no failure / interruption                        |
| S18      | 69-L1  | x                                                |
|          | 70-L2  | x                                                |
|          | 71-L3  | 23:12                                            |
|          | 72-PEN | x                                                |
| S19      | 73-L1  | 71:09                                            |
|          | 74-L2  | x                                                |
|          | 75-L3  | x                                                |
|          | 76-PEN | x                                                |
| S20      | 77-L1  | x                                                |
|          | 78-L2  | x                                                |
|          | 79-L3  | 18:49                                            |
|          | 80-PEN | x                                                |
| S21      | 81-L1  | no failure / interruption                        |
|          | 82-L2  | no failure / interruption                        |
|          | 83-L3  | no failure / interruption                        |
|          | 84-PEN | no failure / interruption                        |
| S22      | 85-L1  | no failure / interruption                        |
|          | 86-L2  | no failure / interruption                        |
|          | 87-L3  | no failure / interruption                        |
|          | 88-PEN | no failure / interruption                        |
| S23      | 89-L1  | x                                                |
|          | 90-L2  | x                                                |
|          | 91-L3  | 59:30                                            |
|          | 92-PEN | x                                                |
| S24      | 93-L1  | no failure / interruption                        |
|          | 94-L2  | no failure / interruption                        |
|          | 95-L3  | no failure / interruption                        |
|          | 96-PEN | no failure / interruption                        |

|                                                       |
|-------------------------------------------------------|
| Specimen 17: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 |
| Specimen 18: cables NHXH 4x1,5 RE FE180 PH30/E30      |
| Specimen 19: cables NHXCH 4x50/25 RM FE180 PH30/E30   |
| Specimen 20: cables NHXH 4x50 RM FE180 PH30/E30       |
| Specimen 21: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 |
| Specimen 22: cables NHXCH 4x50/25 RM FE180 PH90/E90   |
| Specimen 23: cables NHXH 4x50 RM FE180 PH30/E30       |
| Specimen 24: cable NHXCH 4x50/25 RM FE180 PH90/E90    |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S25 to S33**

| Specimen | Bulbs   | Time to permanent failure / interruption [min:s] |
|----------|---------|--------------------------------------------------|
| S25      | 97-L1   | no failure / interruption                        |
|          | 98-L2   | no failure / interruption                        |
|          | 99-L3   | no failure / interruption                        |
|          | 100-PEN | no failure / interruption                        |
| S26      | 101-L1  | no failure / interruption                        |
|          | 102-L2  | no failure / interruption                        |
|          | 103-L3  | no failure / interruption                        |
|          | 104-PEN | no failure / interruption                        |
| S27      | 105-L1  | no failure / interruption                        |
|          | 106-L2  | no failure / interruption                        |
|          | 107-L3  | no failure / interruption                        |
|          | 108-PEN | no failure / interruption                        |
| S28      | 109-L1  | no failure / interruption                        |
|          | 110-L2  | no failure / interruption                        |
|          | 111-L3  | no failure / interruption                        |
|          | 112-PEN | no failure / interruption                        |
| S29      | 113-L1  | no failure / interruption                        |
|          | 114-L2  | no failure / interruption                        |
|          | 115-L3  | no failure / interruption                        |
|          | 116-PEN | no failure / interruption                        |
| S30      | 117-L1  | no failure / interruption                        |
|          | 118-L2  | no failure / interruption                        |
|          | 119-L3  | no failure / interruption                        |
|          | 120-PEN | no failure / interruption                        |
| S31      | 121-L1  | no failure / interruption                        |
|          | 122-L2  | no failure / interruption                        |
|          | 123-L3  | no failure / interruption                        |
|          | 124-PEN | no failure / interruption                        |
| S32      | 125-L1  | no failure / interruption                        |
|          | 126-L2  | no failure / interruption                        |
|          | 127-L3  | no failure / interruption                        |
|          | 128-PEN | no failure / interruption                        |
| S33      | 129-L1  | no failure / interruption                        |
|          | 130-L2  | no failure / interruption                        |
|          | 131-L3  | no failure / interruption                        |
|          | 132-PEN | no failure / interruption                        |

|                                                       |
|-------------------------------------------------------|
| Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90    |
| Specimen 26: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  |
| Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  |
| Specimen 28: cables NHXH 4x50 RM FE180 PH90/E90       |
| Specimen 29: cables NHXH 4x1,5 RE FE180 PH90/E90      |
| Specimen 30: cables NHXH 4x1,5 RE FE180 PH90/E90      |
| Specimen 31: cables NHXH 4x50 RM FE180 PH90/E90       |
| Specimen 32: cables NHXH 4x1,5 RE FE180 PH90/E90      |
| Specimen 33: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S34 to S42**

| Specimen | Bulbs   | Time to permanent failure / interruption<br>[min:s] |
|----------|---------|-----------------------------------------------------|
| S34      | 133-L1  | no failure / interruption                           |
|          | 134-L2  | no failure / interruption                           |
|          | 135-L3  | no failure / interruption                           |
|          | 136-PEN | no failure / interruption                           |
| S35      | 137-L1  | x                                                   |
|          | 138-L2  | 80:38                                               |
|          | 139-L3  | 80:38                                               |
|          | 140-PEN | x                                                   |
| S37      | 145-L1  | no failure / interruption                           |
|          | 146-L2  | no failure / interruption                           |
|          | 147-L3  | no failure / interruption                           |
|          | 148-PEN | no failure / interruption                           |
| S38      | 149-L1  | x                                                   |
|          | 150-L2  | 81:43                                               |
|          | 151-L3  | x                                                   |
|          | 152-PEN | x                                                   |
| S39      | 153-L1  | no failure / interruption                           |
|          | 154-L2  | no failure / interruption                           |
|          | 155-L3  | no failure / interruption                           |
|          | 156-PEN | no failure / interruption                           |
| S40      | 157-L1  | no failure / interruption                           |
|          | 158-L2  | no failure / interruption                           |
|          | 159-L3  | no failure / interruption                           |
|          | 160-PEN | no failure / interruption                           |
| S41      | 161-L1  | no failure / interruption                           |
|          | 162-L2  | no failure / interruption                           |
|          | 163-L3  | no failure / interruption                           |
|          | 164-PEN | no failure / interruption                           |
| S42      | 165-L1  | no failure / interruption                           |
|          | 166-L2  | no failure / interruption                           |
|          | 167-L3  | no failure / interruption                           |
|          | 168-PEN | no failure / interruption                           |

|                                                       |
|-------------------------------------------------------|
| Specimen 34: cables NHXCH 4x16/16 RM FE180 PH90/E90   |
| Specimen 35: cables NHXH 4x16 RM FE180 PH90/E90       |
| Specimen 37: cables NHXH 4x1,5 RE FE180 PH30/E30      |
| Specimen 38: cables NHXCH 4x50/25 RM FE180 PH30/E30   |
| Specimen 39: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 |
| Specimen 40: cable NHXH 4x50 RM FE180 PH90/E90        |
| Specimen 41: cable NHXH 4x50 RM FE180 PH90/E90        |
| Specimen 42: cable NHXH 4x1,5 RE FE180 PH90/E90       |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S43 to S49**

| Specimen | Bulbs   | Time to permanent failure / interruption [min:s] |
|----------|---------|--------------------------------------------------|
| S43      | 169-L1  | no failure / interruption                        |
|          | 170-L2  | no failure / interruption                        |
|          | 171-L3  | no failure / interruption                        |
|          | 172-PEN | no failure / interruption                        |
| S44      | 173-L1  | no failure / interruption                        |
|          | 174-L2  | no failure / interruption                        |
|          | 175-L3  | no failure / interruption                        |
|          | 176-PEN | no failure / interruption                        |
| S45      | 177-L1  | no failure / interruption                        |
|          | 178-L2  | no failure / interruption                        |
|          | 179-L3  | no failure / interruption                        |
|          | 180-PEN | no failure / interruption                        |
| S46      | 181-L1  | no failure / interruption                        |
|          | 182-L2  | no failure / interruption                        |
|          | 183-L3  | no failure / interruption                        |
|          | 184-PEN | no failure / interruption                        |
| S47      | 185-L1  | no failure / interruption                        |
|          | 186-L2  | no failure / interruption                        |
|          | 187-L3  | no failure / interruption                        |
|          | 188-PEN | no failure / interruption                        |
| S48      | 189-L1  | 65:38                                            |
|          | 190-L2  | x                                                |
|          | 191-L3  | x                                                |
|          | 192-PEN | x                                                |
| S49      | 193-L1  | no failure / interruption                        |
|          | 194-L2  | no failure / interruption                        |
|          | 195-L3  | no failure / interruption                        |
|          | 196-PEN | no failure / interruption                        |

|                                                  |
|--------------------------------------------------|
| Specimen 43: cable NHXH 4x1,5 RE FE180 PH90/E90  |
| Specimen 44: cable NHXH 4x50 RM FE180 PH90/E90   |
| Specimen 45: cable NHXH 4x50 RM FE180 PH90/E90   |
| Specimen 46: cable NHXH 4x1,5 RE FE180 PH90/E90  |
| Specimen 47: cable NHXH 4x1,5 RE FE180 PH90/E90  |
| Specimen 48: cables NHXH 4x50 RM FE180 PH90/E90  |
| Specimen 49: cables NHXH 4x1,5 RE FE180 PH90/E90 |

- x** conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S52 to S59**

| Specimen | Bulbs   | Time to permanent failure / interruption [min:s] |
|----------|---------|--------------------------------------------------|
| S52A     | 209-L   | no failure / interruption                        |
|          | 210-PEN | no failure / interruption                        |
| S52B     | 211-L   | no failure / interruption                        |
|          | 212-PEN | no failure / interruption                        |
| S53A     | 213-L   | no failure / interruption                        |
|          | 214-PEN | no failure / interruption                        |
| S53B     | 215-L   | no failure / interruption                        |
|          | 216-PEN | no failure / interruption                        |
| S54A     | 217-L   | no failure / interruption                        |
|          | 218-PEN | no failure / interruption                        |
| S54B     | 219-L   | no failure / interruption                        |
|          | 220-PEN | no failure / interruption                        |
| S55A     | 221-L   | no failure / interruption                        |
|          | 222-PEN | no failure / interruption                        |
| S55B     | 223-L   | no failure / interruption                        |
|          | 224-PEN | no failure / interruption                        |
| S56A     | 225-L   | no failure / interruption                        |
|          | 226-PEN | no failure / interruption                        |
| S56B     | 227-L   | no failure / interruption                        |
|          | 228-PEN | no failure / interruption                        |
| S57A     | 229-L   | 24:42                                            |
|          | 230-PEN | x                                                |
| S57B     | 231-L   | 36:25                                            |
|          | 232-PEN | x                                                |
| S58A     | 233-L   | no failure / interruption                        |
|          | 234-PEN | no failure / interruption                        |
| S58B     | 235-L   | no failure / interruption                        |
|          | 236-PEN | no failure / interruption                        |
| S59A     | 237-L   | no failure / interruption                        |
|          | 238-PEN | no failure / interruption                        |
| S59B     | 239-L   | no failure / interruption                        |
|          | 240-PEN | no failure / interruption                        |

|                                                          |
|----------------------------------------------------------|
| Specimens 52: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimens 53: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |
| Specimen 54A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimen 54B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimens 55: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimens 56: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimens 57: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimens 58: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimens 59: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,3W.  
Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S60 to S67**

| Specimen | Bulbs   | Time to permanent failure / interruption [min:s] |
|----------|---------|--------------------------------------------------|
| S60A     | 241-L   | no failure / interruption                        |
|          | 242-PEN | no failure / interruption                        |
| S60B     | 243-L   | no failure / interruption                        |
|          | 244-PEN | no failure / interruption                        |
| S61A     | 245-L   | no failure / interruption                        |
|          | 246-PEN | no failure / interruption                        |
| S61B     | 247-L   | no failure / interruption                        |
|          | 248-PEN | no failure / interruption                        |
| S62A     | 249-L   | no failure / interruption                        |
|          | 250-PEN | no failure / interruption                        |
| S62B     | 251-L   | no failure / interruption                        |
|          | 252-PEN | no failure / interruption                        |
| S63A     | 253-L   | no failure / interruption                        |
|          | 254-PEN | no failure / interruption                        |
| S63B     | 255-L   | no failure / interruption                        |
|          | 256-PEN | no failure / interruption                        |
| S64A     | 257-L   | no failure / interruption                        |
|          | 258-PEN | no failure / interruption                        |
| S64B     | 259-L   | no failure / interruption                        |
|          | 260-PEN | no failure / interruption                        |
| S65A     | 261-L   | no failure / interruption                        |
|          | 262-PEN | no failure / interruption                        |
| S65B     | 263-L   | no failure / interruption                        |
|          | 264-PEN | no failure / interruption                        |
| S66A     | 265-L   | no failure / interruption                        |
|          | 266-PEN | no failure / interruption                        |
| S66B     | 267-L   | no failure / interruption                        |
|          | 268-PEN | no failure / interruption                        |
| S67A     | 269-L   | no failure / interruption                        |
|          | 270-PEN | no failure / interruption                        |
| S67B     | 271-L   | no failure / interruption                        |
|          | 272-PEN | no failure / interruption                        |

|                                                          |
|----------------------------------------------------------|
| Specimens 60: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimen 61A: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimen 61B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimen 62A: cables HDGszzo 3x2,5 FE180 PH90/E30-E90    |
| Specimen 62B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimen 63A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimen 63B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimen 64A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimen 64B: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimens 65: cables HDGszzo 3x2,5 FE180 PH90/E30-E90    |
| Specimens 66: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimens 67: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |

- x conductor was turned off manually after permanent interruption / failure of other conductors in the cable

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diodes 3V / 0,3W. Circuit breakers with rating 3 A were used.

**Measured time of tested specimens from S68 to S75**

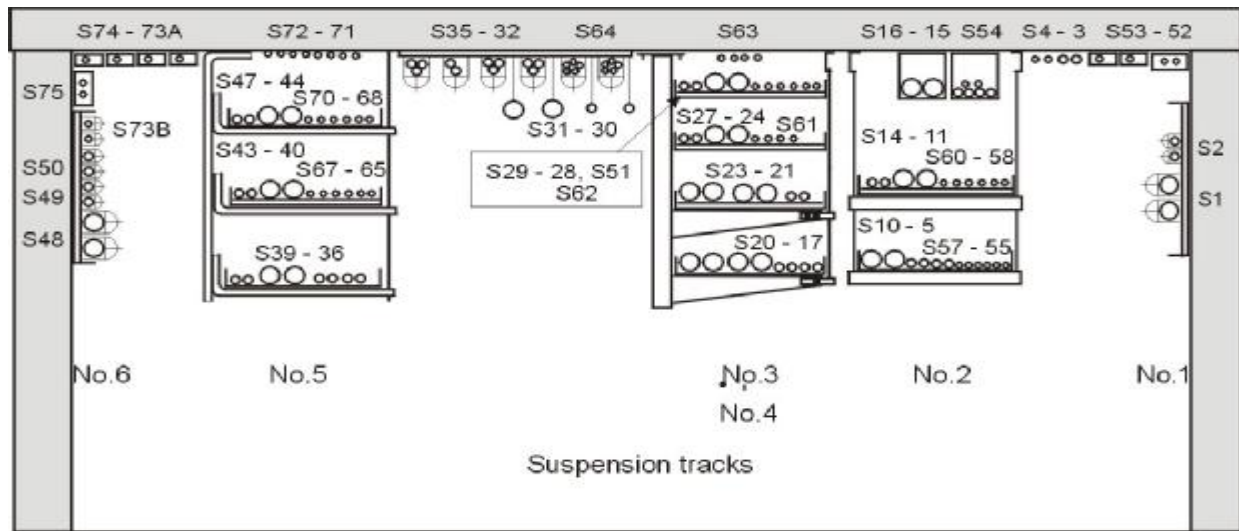
| Specimen | Bulbs   | Time to permanent failure / interruption [min:s] |
|----------|---------|--------------------------------------------------|
| S68A     | 273-L   | no failure / interruption                        |
|          | 274-PEN | no failure / interruption                        |
| S68B     | 275-L   | 47:40                                            |
|          | 276-PEN | x                                                |
| S69A     | 277-L   | no failure / interruption                        |
|          | 278-PEN | no failure / interruption                        |
| S69B     | 279-L   | no failure / interruption                        |
|          | 280-PEN | no failure / interruption                        |
| S70A     | 281-L   | no failure / interruption                        |
|          | 282-PEN | no failure / interruption                        |
| S70B     | 283-L   | no failure / interruption                        |
|          | 284-PEN | no failure / interruption                        |
| S71A     | 285-L   | no failure / interruption                        |
|          | 286-PEN | no failure / interruption                        |
| S71B     | 287-L   | 49:53                                            |
|          | 288-PEN | x                                                |
| S72A     | 289-L   | no failure / interruption                        |
|          | 290-PEN | no failure / interruption                        |
| S72B     | 291-L   | no failure / interruption                        |
|          | 292-PEN | no failure / interruption                        |
| S73A     | 293-L   | no failure / interruption                        |
|          | 294-PEN | no failure / interruption                        |
| S73B     | 295-L   | no failure / interruption                        |
|          | 296-PEN | no failure / interruption                        |
| S74A     | 297-L   | no failure / interruption                        |
|          | 298-PEN | no failure / interruption                        |
| S74B     | 299-L   | no failure / interruption                        |
|          | 300-PEN | no failure / interruption                        |
| S75A     | 301-L   | no failure / interruption                        |
|          | 302-PEN | no failure / interruption                        |
| S75B     | 303-L   | no failure / interruption                        |
|          | 304-PEN | no failure / interruption                        |

|                                                          |
|----------------------------------------------------------|
| Specimens 68: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimens 69: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimens 70: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimen 71A: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |
| Specimen 71B: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimen 72A: cables HDGsekwzo 3x2,5 FE180 PH90/E30-E90  |
| Specimen 72B: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |
| Specimen 73A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |
| Specimen 73B: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |
| Specimens 74: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |
| Specimens 75: cables HDGszo 3x2,5 FE180 PH90/E30-E90     |

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable.

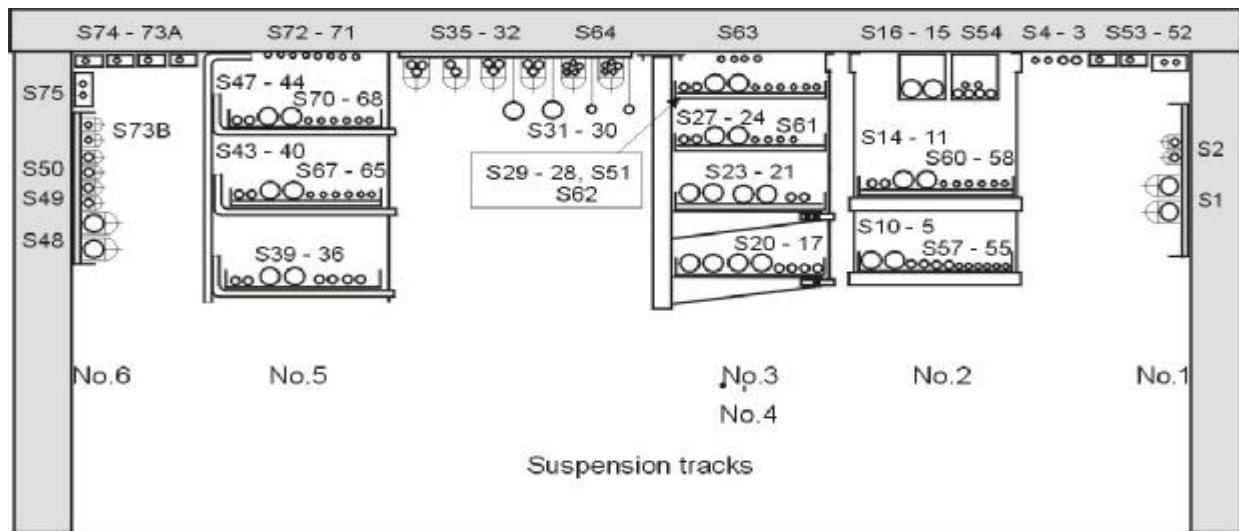
Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,03W.  
Circuit breakers with rating 3 A were used.

### Layout of cables in the test furnace



|                                                       |                                                                                                  |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Specimen 1: cables NHXCH 4x50/25 RM FE180 PH90/E90    | Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.1                     |
| Specimen 2: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90  |                                                                                                  |
| Specimen 3: cables NHXH 4x50 RM FE180 PH90/E90        | Specimens placed in ceiling clips UEF (BAKS) in spacing of 600 mm.                               |
| Specimen 4: cables NHXH 4x1,5 RE FE180 PH90/E90       |                                                                                                  |
| Specimen 5: cable NHXH 4x1,5 RE FE180 PH90/E90        |                                                                                                  |
| Specimen 6: cable NHXH 4x1,5 RE FE180 PH90/E90        |                                                                                                  |
| Specimen 7: cable NHXH 4x50 RM FE180 PH90/E90         | Specimens placed on the ladders DGOD 400H60/3E (BAKS). Suspension track No.2                     |
| Specimen 8: cable NHXH 4x50 RM FE180 PH90/E90         |                                                                                                  |
| Specimen 9: cable NHXCH 4x50/25 RM FE180 PH90/E90     |                                                                                                  |
| Specimen 10: cable NHXCH 4x50/25 RM FE180 PH90/E90    |                                                                                                  |
| Specimen 11: cable NHXH 4x50 RM FE180 PH90/E90        | Specimens placed in the trays KCOJ 400H60/3E (BAKS). Suspension track No.2                       |
| Specimen 12: cable NHXH 4x50 RM FE180 PH90/E90        |                                                                                                  |
| Specimen 13: cable NHXH 4x1,5 RE FE180 PH90/E90       |                                                                                                  |
| Specimen 14: cable NHXH 4x1,5 RE FE180 PH90/E90       |                                                                                                  |
| Specimen 15: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | Specimens placed in ceiling clips OZO (BAKS) in spacing of 600 mm.                               |
| Specimen 16: cables NHXCH 4x50/25 RM FE180 PH90/E90   |                                                                                                  |
| Specimen 17: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 |                                                                                                  |
| Specimen 18: cables NHXH 4x1,5 RE FE180 PH30/E30      | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.4                     |
| Specimen 19: cables NHXCH 4x50/25 RM FE180 PH30/E30   |                                                                                                  |
| Specimen 20: cables NHXH 4x50 RM FE180 PH30/E30       |                                                                                                  |
| Specimen 21: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | Specimens placed in the trays KCOD 400H60/3N (BAKS). Suspension track No.4                       |
| Specimen 22: cables NHXCH 4x50/25 RM FE180 PH90/E90   |                                                                                                  |
| Specimen 23: cables NHXH 4x50 RM FE180 PH30/E30       |                                                                                                  |
| Specimen 24: cable NHXCH 4x50/25 RM FE180 PH90/E90    | Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3                     |
| Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90    |                                                                                                  |
| Specimen 26: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  |                                                                                                  |
| Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90  |                                                                                                  |
| Specimen 28: cables NHXH 4x50 RM FE180 PH90/E90       | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.3                     |
| Specimen 29: cables NHXH 4x1,5 RE FE180 PH90/E90      |                                                                                                  |
| Specimen 30: cables NHXH 4x1,5 RE FE180 PH90/E90      | Specimens placed in ceiling clips KSA with threaded bar PGM6/1x150 (BAKS) in spacing of 600 mm.  |
| Specimen 31: cables NHXH 4x50 RM FE180 PH90/E90       |                                                                                                  |
| Specimen 32: cables NHXH 4x1,5 RE FE180 PH90/E90      |                                                                                                  |
| Specimen 33: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90 | Specimens placed in ceiling profile ledges SDOC 400 with clips UKO1 (BAKS) in spacing of 600 mm. |
| Specimen 34: cables NHXCH 4x16/16 RM FE180 PH90/E90   |                                                                                                  |
| Specimen 35: cables NHXH 4x16 RM FE180 PH90/E90       |                                                                                                  |
| Specimen 37: cables NHXH 4x1,5 RE FE180 PH30/E30      | Specimens placed in the trays KCOD 400H60/3N (BAKS). Suspension track No.5                       |
| Specimen 38: cables NHXCH 4x50/25 RM FE180 PH30/E30   |                                                                                                  |
| Specimen 39: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30 |                                                                                                  |
| Specimen 40: cable NHXH 4x50 RM FE180 PH90/E90        | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.5                     |
| Specimen 41: cable NHXH 4x50 RM FE180 PH90/E90        |                                                                                                  |

### Layout of cables in the test furnace



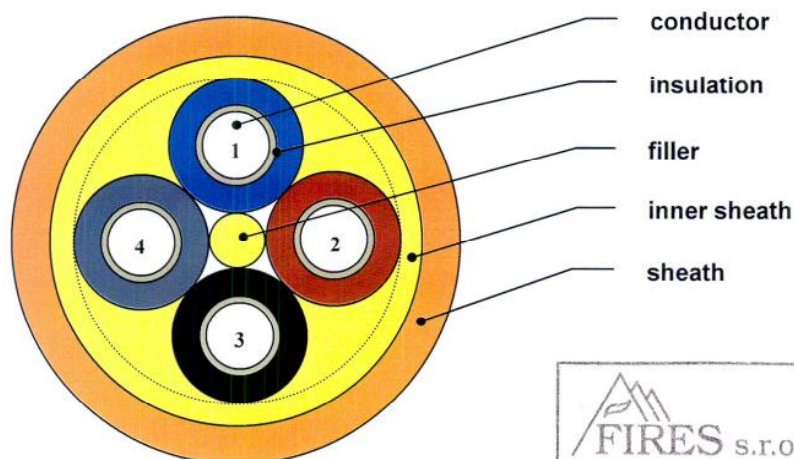
|                                                          |                                                                                                  |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Specimen 42: cable NHXH 4x1,5 RE FE180 PH90/E90          | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.5                     |
| Specimen 43: cable NHXH 4x1,5 RE FE180 PH90/E90          |                                                                                                  |
| Specimen 44: cable NHXH 4x50 RM FE180 PH90/E90           | Specimens placed in the trays KCOD 400H60/3N (BAKS). Suspension track No.5                       |
| Specimen 45: cable NHXH 4x50 RM FE180 PH90/E90           |                                                                                                  |
| Specimen 46: cable NHXH 4x1,5 RE FE180 PH90/E90          | Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.6                     |
| Specimen 47: cable NHXH 4x1,5 RE FE180 PH90/E90          |                                                                                                  |
| Specimen 48: cables NHXH 4x50 RM FE180 PH90/E90          |                                                                                                  |
| Specimen 49: cables NHXH 4x1,5 RE FE180 PH90/E90         |                                                                                                  |
| Specimens 52: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | Specimens placed in plastic ledge with clips UDF and UEF in spacing of 300 mm.                   |
| Specimens 53: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     |                                                                                                  |
| Specimen 54A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | Specimens placed in ceiling clips OZO (BAKS) in spacing of 600 mm.                               |
| Specimen 54B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |                                                                                                  |
| Specimens 55: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | Specimens placed on the ladders DGOD 400H60/3E (BAKS). Suspension track No.2                     |
| Specimens 56: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimens 57: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | Specimens placed in the trays KCOJ 400H60/3E (BAKS). Suspension track No.2                       |
| Specimens 58: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |                                                                                                  |
| Specimens 59: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3                     |
| Specimens 60: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimen 61A: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.3                     |
| Specimen 61B: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |                                                                                                  |
| Specimen 62A: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | Specimens placed in ceiling clips KSA (BAKS) in spacing of 600 mm                                |
| Specimen 62B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimen 63A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | Specimens placed in ceiling profile ledges SDOC 400 with clips UKO1 (BAKS) in spacing of 600 mm. |
| Specimen 63B: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimen 64A: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | Specimens placed on the ladders DUOP 400H60/3N (BAKS). Suspension track No.5                     |
| Specimen 64B: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  |                                                                                                  |
| Specimens 65: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | Specimens placed in the trays KCOD 400H60/3N (BAKS). Suspension track No.5                       |
| Specimens 66: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimens 67: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | Specimens placed in ceiling clips UDF (BAKS) in spacing of 600 mm.                               |
| Specimens 68: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  |                                                                                                  |
| Specimens 69: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    | Specimens placed in ceiling clips UEF (BAKS) in spacing of 600 mm.                               |
| Specimens 70: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |                                                                                                  |
| Specimen 71A: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     | Specimens placed on the ladders DGOP 400H60/3N. No.6                                             |
| Specimen 71B: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  |                                                                                                  |
| Specimen 72A: cables HDGsekwz0 3x2,5 FE180 PH90/E30-E90  | Specimens placed in plastic ledge with clips UDF in spacing of 300 mm.                           |
| Specimen 72B: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     |                                                                                                  |
| Specimen 73B: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     |                                                                                                  |
| Specimen 73A: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |                                                                                                  |
| Specimens 74: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90    |                                                                                                  |
| Specimens 75: cables HDGsz0 3x2,5 FE180 PH90/E30-E90     |                                                                                                  |

## Photos taken before the test



**Photos taken after the termination of the test**



**NHXX FE180 PH30/E30 0,6/1 kV****FIRE RESISTANT HALOGEN FREE POWER CABLES**

|                                                                                                                                                   |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>        |
|                                                                                                                                                   | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-09-AWE</i>                                                                                            |                                        |
| Příloha č./Appendix No. <i>16</i>                                                                                                                 |                                        |

**APPLICATIONS**

NHXX FE180 PH30/E30 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

Halogen free cables shall be applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – power is supplied to equipment which must operate in fire conditions and during fire fighting. The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpowozarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

**CONSTRUCTION**

- |                     |   |                                                                                                                                  |
|---------------------|---|----------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>    | – | bare copper, solid or stranded, according to PN-EN 60228, EN 60228                                                               |
| <b>insulation</b>   | – | mica tape and halogen free cross-linked compound insulation - colours in accordance with PN-HD 308,                              |
| <b>filler</b>       | – | filler made of halogen free compound,                                                                                            |
| <b>inner sheath</b> | – | inner sheath made of halogen free compound,                                                                                      |
| <b>sheath</b>       | – | orange, cable sheath made of halogen free compound according to HD 604 S1 and VDE 0276-604 –HM4, (oxygen index bigger than 35%). |



|                                                 |                                        |
|-------------------------------------------------|----------------------------------------|
| <br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE        | Datum/Date<br>16.01.2009               |
|                                                 | Podpis/Signature<br><i>[Signature]</i> |
| Dokument o.<br>Document No. FIRES-FR-004-09-AWE |                                        |
| Priloha A /Appendix No. 14                      |                                        |

ISO  
9001:2000

NHXH FE180 PH30/E30 0,6/1 kV

## CHARACTERISTICS

The cables maintain their functions for 30 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

| Conductor cross-section |                                 |
|-------------------------|---------------------------------|
| Number of conductors    | Nominal conductor cross-section |
| no                      | mm <sup>2</sup>                 |
| 1                       | 16 ÷ 400                        |
| 2 - 5                   | 1 ÷ 240                         |
| 7 - 19                  | 1; 1.5; 2.5 i 4                 |
| 24 - 40                 | 1; 1.5; 2.5                     |

|                                                               |                           |                             |                                                              |
|---------------------------------------------------------------|---------------------------|-----------------------------|--------------------------------------------------------------|
| Operating voltage                                             | 0.6/1 kV                  | Operating temperature range |                                                              |
| Voltage test                                                  | 4.0 kV rms                | during operation            | from -15 to +90°C                                            |
| Insulation resistivity at 90°C, minimum                       | 1 x 10 <sup>11</sup> Ω·cm | during installation         | from -5 to +70°C                                             |
| Inductance, approximate                                       | 0.7 mH/km                 | Minimum bending radius      | 12 x cable diameter                                          |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |                           | Cable combustibility        | flame retardant                                              |
| pH, approximate                                               | 6.8                       | Circuit integrity *         |                                                              |
| conductivity, approximate                                     | 0.4 μS/mm                 | E30                         | DIN 4102-12                                                  |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |                           | PH30                        | PN-EN 50200 or PN-EN 50362                                   |
| light transmittance, minimum                                  | 94%                       | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11                                   |
|                                                               |                           | Combustibility tests        | PN-EN 50266-2-4, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362 |
|                                                               |                           | Reference standards         | AT-0603-0064/2006, WT-TK-44                                  |
|                                                               |                           |                             | DIN VDE 0266                                                 |
|                                                               |                           |                             | PN-HD 604 S1                                                 |

\* Circuit integrity is dependent on installation method.

CE = the cable meets requirements of the low voltage directive 2006/95/WE

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 1 x 6,0 RE                                     | 8,3                          | 58,0         | 120                  |
|             | 1 x 10 RE                                      | 9,3                          | 96,0         | 160                  |
|             | 1 x 16 RE                                      | 10,3                         | 154,0        | 240                  |
|             | 1 x 25 RM                                      | 12,3                         | 240,0        | 340                  |
|             | 1 x 35 RM                                      | 13,4                         | 336,0        | 450                  |
|             | 1 x 50 RM                                      | 14,1                         | 480,0        | 570                  |
|             | 1 x 70 RM                                      | 15,9                         | 672,0        | 775                  |
|             | 1 x 95 RM                                      | 17,7                         | 912,0        | 1030                 |
|             | 1 x 120 RM                                     | 19,3                         | 1152,0       | 1260                 |
|             | 2 x 1,5 RE                                     | 13,2                         | 28,8         | 245                  |
|             | 2 x 2,5 RE                                     | 14,0                         | 48,0         | 285                  |
|             | 2 x 4,0 RE                                     | 14,9                         | 77,0         | 345                  |
|             | 2 x 6,0 RE                                     | 15,9                         | 115,0        | 415                  |
|             | 2 x 10 RE                                      | 17,6                         | 192,0        | 550                  |
|             | 2 x 16 RE                                      | 19,6                         | 307,0        | 745                  |
|             | 2 x 25 RM                                      | 23,2                         | 480,0        | 1030                 |
|             | 3 x 1,5 RE                                     | 13,7                         | 43,2         | 270                  |
|             | 3 x 2,5 RE                                     | 14,6                         | 72,0         | 325                  |
|             | 3 x 4,0 RE                                     | 15,6                         | 115,0        | 400                  |
|             | 3 x 6,0 RE                                     | 16,7                         | 173,0        | 490                  |
|             | 3 x 10 RE                                      | 18,5                         | 288,0        | 670                  |

RE - single wire round conductor;  
RM - multiwire round conductor

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 3 x 16 RM                                      | 20,9                         | 461,0        | 885                  |
|             | 3 x 25 RM                                      | 24,6                         | 720,0        | 1270                 |
|             | 4 x 1,5 RE                                     | 14,7                         | 58,0         | 315                  |
|             | 4 x 2,5 RE                                     | 15,7                         | 96,0         | 380                  |
|             | 4 x 4,0 RE                                     | 16,9                         | 154,0        | 475                  |
|             | 4 x 6,0 RE                                     | 18,1                         | 230,0        | 585                  |
|             | 4 x 10 RE                                      | 20,1                         | 384,0        | 805                  |
|             | 4 x 16 RM                                      | 22,7                         | 614,0        | 1095                 |
|             | 4 x 25 RM                                      | 26,8                         | 960,0        | 1550                 |
|             | 4 x 35 RM                                      | 30,7                         | 1920,0       | 1550                 |
|             | 4 x 50 RM                                      | 31,7                         | 1920,0       | 2590                 |
|             | 5 x 1,5 RE                                     | 15,8                         | 72,0         | 365                  |
|             | 5 x 2,5 RE                                     | 16,9                         | 120,0        | 445                  |
|             | 5 x 4,0 RE                                     | 18,2                         | 192,0        | 560                  |
|             | 5 x 6,0 RE                                     | 19,5                         | 288,0        | 695                  |
|             | 5 x 10 RE                                      | 21,8                         | 480,0        | 965                  |
|             | 5 x 16 RM                                      | 24,8                         | 768,0        | 1320                 |
|             | 5 x 25 RM                                      | 28,5                         | 1200,0       | 1880                 |
|             | 5 x 35 RM                                      | 31,8                         | 1680,0       | 2480                 |
|             | 5 x 50 RM                                      | 35,0                         | 2400,0       | 3180                 |
|             | 7 x 1,5 RE                                     | 16,9                         | 101,0        | 425                  |

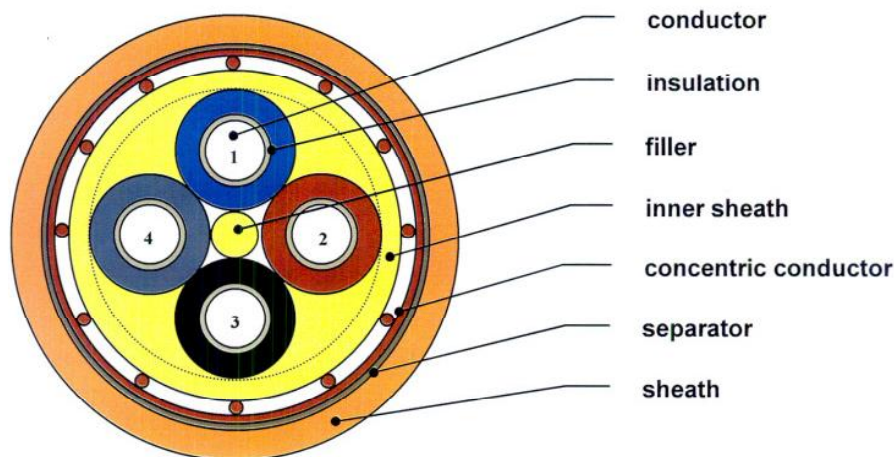
Other cross-sections and conductor counts available on request.

TECHNOKABEL SA, 04-343 Warszawa, ul. Nasielska 55, POLAND  
Export Department: tel +(48 22) 516 97 67, fax +(48 22) 516 97 87[www.technokabel.com.pl](http://www.technokabel.com.pl)  
[export@technokabel.com.pl](mailto:export@technokabel.com.pl)

K199A02B

## NHXCH FE180 PH30/E30 0,6/1 kV

### FIRE RESISTANT HALOGEN FREE POWER CABLES



### APPLICATIONS

**NHXCH FE180 PH30/E30 0,6/1 kV** fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

Halogen free cables shall be applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – power is supplied to equipment which must operate in fire conditions and during fire fighting. The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

### CONSTRUCTION

|                             |   |                                                                                                                                   |
|-----------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>            | – | bare copper, solid or stranded, according to PN-EN 60228, EN 60228,                                                               |
| <b>insulation</b>           | – | mica tape and halogen free cross-linked compound insulation - colours in accordance with PN-HD 308,                               |
| <b>filler</b>               | – | filler made of halogen free compound,                                                                                             |
| <b>inner sheath</b>         | – | inner sheath made of halogen free compound,                                                                                       |
| <b>concentric conductor</b> | – | concentric conductor made of bare copper wires and a copper tape binder wrapped over the inner sheath,                            |
| <b>separator</b>            | – | polyester tape,                                                                                                                   |
| <b>sheath</b>               | – | orange, cable sheath made of halogen free compound according to HD 604 S1 and VDE 0276-604 – HM4, (oxygen index bigger than 35%). |

# NHXCH FE180 PH30/E30 0,6/1 kV

## CHARACTERISTICS

The cables maintain their functions for 30 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

| Conductor cross-section |                                 |
|-------------------------|---------------------------------|
| Number of conductors    | Nominal conductor cross-section |
| no                      | mm <sup>2</sup>                 |
| 1                       | 16 ÷ 400                        |
| 2 - 5                   | 1 ÷ 240                         |
| 7 - 19                  | 1; 1.5; 2.5 ÷ 4                 |
| 24 - 40                 | 1; 1.5; 2.5                     |

|                                                               |                           |                             |                                 |
|---------------------------------------------------------------|---------------------------|-----------------------------|---------------------------------|
| Operating voltage                                             | 0.6/1 kV                  | Operating temperature range |                                 |
| Voltage test                                                  | 4.0 kV rms                | during operation            | from -15 to +90°C               |
| Insulation resistivity at 90°C, minimum                       | 1 x 10 <sup>11</sup> Ω·cm | during installation         | from -5 to +70°C                |
| Inductance, approximate                                       | 0.7 mH/km                 | Minimum bending radius      | 12 x cable diameter             |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |                           | Cable combustibility        | flame retardant                 |
| pH, approximate                                               | 6.8                       | Circuit integrity *         |                                 |
| conductivity, approximate                                     | 0.4 μS/mm                 | E30                         | DIN 4102-12                     |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |                           | PH30                        | PN-EN 50200 or PN-EN 50362      |
| light transmittance, minimum                                  | 94%                       | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11      |
|                                                               |                           | Combustibility tests        | PN-EN 50266-2-4, IEC 60332-3-24 |
|                                                               |                           |                             | PN-EN 50200 and PN-EN 50362     |
|                                                               |                           | Reference standards         | AT-0603-0064/2006, WT-TK-44     |
|                                                               |                           |                             | DIN VDE 0266                    |
|                                                               |                           |                             | PN-HD 604 S1                    |

\* Circuit integrity is dependent on installation method.

CE = the cable meets requirements of the low voltage directive 2006/95/WE

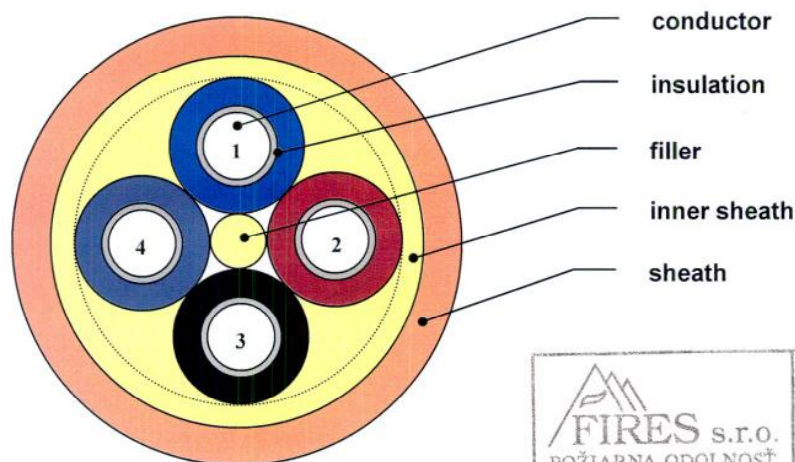
| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 3 x 1,5RE/1,5                                  | 15,4                         | 43,2         | 320                  |
|             | 3 x 2,5 RE/2,5                                 | 16,5                         | 72           | 390                  |
|             | 3 x 4,0 RE/4,0                                 | 17,6                         | 115          | 460                  |
|             | 3 x 6,0 RE/6,0                                 | 19,6                         | 173          | 590                  |
|             | 3 x 10 RE/10                                   | 22,6                         | 288          | 840                  |
|             | 3 x 16 RE/16                                   | 25,8                         | 461          | 1190                 |
|             | 3 x 25 RM/16                                   | 29,1                         | 720          | 1570                 |
|             | 3 x 35 RM/16                                   | 32,7                         | 1190         | 1960                 |
|             | 3 x 50 RM/25                                   | 35,7                         | 1723         | 2560                 |
|             | 4 x 1,5RE/1,5                                  | 15,8                         | 72           | 350                  |
|             | 4 x 2,5 RE/2,5                                 | 17,8                         | 96           | 450                  |
|             | 4 x 4,0 RE/4,0                                 | 18,9                         | 154          | 530                  |

RE - single wire round conductor;  
RM - multiwire round conductor

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 4 x 6,0 RE/6,0                                 | 21,1                         | 230          | 690                  |
|             | 4 x 10 RE/10                                   | 25,8                         | 384          | 1020                 |
|             | 4 x 16 RE/16                                   | 25,2                         | 614          | 1280                 |
|             | 4 x 25 RM/16                                   | 31,5                         | 960          | 1890                 |
|             | 4 x 35 RE/16                                   | 32,3                         | 1498         | 2350                 |
|             | 4 x 50 RM/25                                   | 34,4                         | 2160         | 2870                 |
|             | 7 x 1,5RE/2,5                                  | 19,5                         | 101          | 520                  |
|             | 7 x 2,5 RE/2,5                                 | 20,7                         | 168          | 620                  |
|             | 12 x 1,5RE/2,5                                 | 24,6                         | 101          | 830                  |
|             | 12 x 2,5 RE/4,0                                | 26,7                         | 168          | 1030                 |

Other cross-sections and conductor counts available on request.

|                                                                                                                                                  |                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
|  <b>FIRES s.r.o.</b><br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009               |
|                                                                                                                                                  | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. / Document No. <i>FIRES-FR-004-04-ANE</i>                                                                                            |                                        |
| Príloha č. / Appendix Nb. <i>19</i>                                                                                                              |                                        |

**NHXX FE180 PH90/E90 0,6/1 kV****FIRE RESISTANT HALOGEN FREE POWER CABLES**

|                                                                                                                                                   |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>        |
|                                                                                                                                                   | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. / Document No. <i>FIRES-FR-004-09-PWE</i>                                                                                             |                                        |
| Príloha č./Appendix No. <i>20</i>                                                                                                                 |                                        |

**APPLICATIONS**

**NHXX FE180 PH90/E90 0,6/1 kV** fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

Halogen free cables shall be applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – power is supplied to equipment which must operate in fire conditions and during fire fighting. The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

**CONSTRUCTION**

- |                     |   |                                                                                                                                  |
|---------------------|---|----------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>    | – | bare copper, solid or stranded, according to PN-EN 60228, EN 60228,                                                              |
| <b>insulation</b>   | – | mica tape and halogen free cross-linked compound insulation - colours in accordance with PN-HD 308,                              |
| <b>filler</b>       | – | filler made of halogen free compound,                                                                                            |
| <b>inner sheath</b> | – | inner sheath made of halogen free compound,                                                                                      |
| <b>sheath</b>       | – | orange, cable sheath made of halogen free compound according to HD 604 S1 and VDE 0276-604 –HM4, (oxygen index bigger than 35%). |



|                                                                 |                                                         |
|-----------------------------------------------------------------|---------------------------------------------------------|
| <br><b>FIRES s.r.o.</b><br>POŽIARNA ODOLNOST<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009                                |
|                                                                 | Podpis/Signature<br><i>[Signature]</i>                  |
|                                                                 | Dokument č.<br>Document No. <i>FIRES-FR-009-09-ANNE</i> |
| Príloha č./Appendix No. <i>21</i>                               |                                                         |

ISO  
9001:2000**NHXX FE180 PH90/E90 0,6/1 kV**

## CHARACTERISTICS

The cables maintain their functions for 90 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

| Conductor cross-section |                                 |
|-------------------------|---------------------------------|
| Number of conductors    | Nominal conductor cross-section |
| no                      | mm <sup>2</sup>                 |
| 1                       | 16 ÷ 400                        |
| 2 - 5                   | 1 ÷ 240                         |
| 7 - 19                  | 1; 1.5; 2.5 ÷ 4                 |
| 24 - 40                 | 1; 1.5; 2.5                     |

|                                                               |                           |                             |                                                                |
|---------------------------------------------------------------|---------------------------|-----------------------------|----------------------------------------------------------------|
| Operating voltage                                             | 0.6/1 kV                  | Operating temperature range |                                                                |
| Voltage test                                                  | 4.0 kV rms                | during operation            | from -15 to +90°C                                              |
| Insulation resistivity at 90°C, minimum                       | 1 x 10 <sup>11</sup> Ω·cm | during installation         | from -5 to +70°C                                               |
| Inductance, approximate                                       | 0.7 mH/km                 | Minimum bending radius      | 12 x cable diameter                                            |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |                           | Cable combustibility        | flame retardant                                                |
| pH, approximate                                               | 6.8                       | Circuit integrity*          |                                                                |
| conductivity, approximate                                     | 0.4 μS/mm                 | E90                         | DIN 4102-12                                                    |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |                           | PH90                        | PN-EN 50200 or PN-EN 50362                                     |
| light transmittance, minimum                                  | 94%                       | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11                                     |
|                                                               |                           | Combustibility tests        | PN-EN 50266-2-4, IEC 60332-3-24<br>PN-EN 50200 and PN-EN 50362 |
|                                                               |                           | Reference standards         | AT-0603-0064/2006, WT-TK-44<br>DIN VDE 0266<br>PN-HD 604 S1    |

\* Circuit integrity is dependent on installation method.

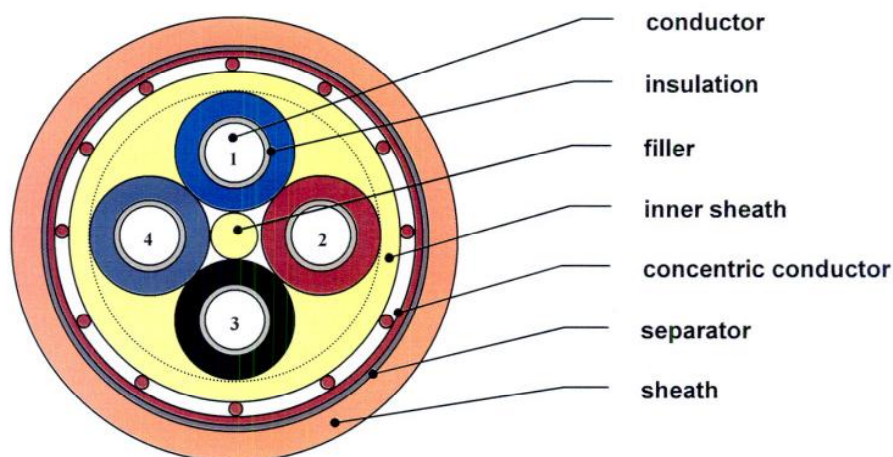
☑ = the cable meets requirements of the low voltage directive 2006/95/WE

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 1 x 6,0 RE                                     | 8,4                          | 58,0         | 125                  |
|             | 1 x 10 RE                                      | 9,4                          | 96,0         | 170                  |
|             | 1 x 16 RE                                      | 10,4                         | 154,0        | 250                  |
|             | 1 x 25 RM                                      | 12,4                         | 240,0        | 355                  |
|             | 1 x 35 RM                                      | 13,4                         | 336,0        | 450                  |
|             | 1 x 50 RM                                      | 14,5                         | 480,0        | 580                  |
|             | 1 x 70 RM                                      | 16,4                         | 672,0        | 790                  |
|             | 1 x 95 RM                                      | 18,1                         | 912,0        | 1040                 |
|             | 1 x 120 RM                                     | 19,7                         | 1152,0       | 1275                 |
|             | 2 x 1,5 RE                                     | 14,0                         | 28,8         | 265                  |
|             | 2 x 2,5 RE                                     | 14,8                         | 48,0         | 315                  |
|             | 2 x 4,0 RE                                     | 15,7                         | 77,0         | 375                  |
|             | 2 x 6,0 RE                                     | 16,7                         | 115,0        | 445                  |
|             | 2 x 10 RE                                      | 18,4                         | 192,0        | 585                  |
|             | 2 x 16 RE                                      | 20,4                         | 307,0        | 780                  |
|             | 2 x 25 RM                                      | 24,0                         | 480,0        | 925                  |
|             | 3 x 1,5 RE                                     | 14,9                         | 43,2         | 315                  |
|             | 3 x 2,5 RE                                     | 15,5                         | 72,0         | 355                  |
|             | 3 x 4,0 RE                                     | 16,5                         | 115,0        | 435                  |
|             | 3 x 6,0 RE                                     | 17,6                         | 173,0        | 525                  |
|             | 3 x 10 RE                                      | 19,3                         | 288,0        | 690                  |

RE - single wire round conductor;  
RM - multiwire round conductor

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 3 x 16 RE                                      | 22,0                         | 461,0        | 980                  |
|             | 3 x 25 RM                                      | 25,5                         | 720,0        | 1390                 |
|             | 4 x 1,5 RE                                     | 15,7                         | 58,0         | 350                  |
|             | 4 x 2,5 RE                                     | 16,7                         | 96,0         | 420                  |
|             | 4 x 4,0 RE                                     | 17,8                         | 154,0        | 510                  |
|             | 4 x 6,0 RE                                     | 19,0                         | 230,0        | 625                  |
|             | 4 x 10 RE                                      | 20,9                         | 384,0        | 835                  |
|             | 4 x 16 RM                                      | 23,7                         | 614,0        | 1140                 |
|             | 4 x 25 RM                                      | 27,8                         | 960,0        | 1720                 |
|             | 4 x 35 RM                                      | 29,5                         | 1344,0       | 2050                 |
|             | 4 x 50 RM                                      | 32,7                         | 1920,0       | 2660                 |
|             | 5 x 1,5 RE                                     | 17,2                         | 72,0         | 425                  |
|             | 5 x 2,5 RE                                     | 18,2                         | 120,0        | 505                  |
|             | 5 x 4,0 RE                                     | 19,3                         | 192,0        | 610                  |
|             | 5 x 6,0 RE                                     | 20,7                         | 288,0        | 750                  |
|             | 5 x 10 RE                                      | 22,7                         | 480,0        | 1000                 |
|             | 5 x 16 RE                                      | 26,3                         | 768,0        | 1460                 |
|             | 5 x 25 RM                                      | 30,6                         | 1200,0       | 2100                 |
|             | 5 x 35 RM                                      | 32,9                         | 1680,0       | 2550                 |
|             | 5 x 50 RM                                      | 37,7                         | 2400,0       | 3550                 |
|             | 7 x 1,5 RE                                     | 18,1                         | 101,0        | 475                  |

Other cross-sections and conductor counts available on request.

**NHXCH FE180 PH90/E90 0,6/1 kV****FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

**NHXCH FE180 PH90/E90 0,6/1 kV** fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

Halogen free cables shall be applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – power is supplied to equipment which must operate in fire conditions and during fire fighting. The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

**CONSTRUCTION**

|                             |   |                                                                                                                                   |
|-----------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>            | – | bare copper, solid or stranded according to PN-EN 60228, EN 60228,                                                                |
| <b>insulation</b>           | – | mica tape and halogen free cross-linked compound insulation - colours in accordance with PN-HD 308,                               |
| <b>filler</b>               | – | filler made of halogen free compound,                                                                                             |
| <b>inner sheath</b>         | – | inner sheath made of halogen free compound,                                                                                       |
| <b>concentric conductor</b> | – | concentric conductor made of bare copper wires and a copper tape binder wrapped over the inner sheath,                            |
| <b>separator</b>            | – | polyester tape,                                                                                                                   |
| <b>sheath</b>               | – | orange, cable sheath made of halogen free compound according to HD 604 S1 and VDE 0276-604 – HM4, (oxygen index bigger than 35%). |

# NHXCH FE180 PH90/E90 0,6/1 kV

## CHARACTERISTICS

The cables maintain their functions for 90 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

| Conductor cross-section |                                 |
|-------------------------|---------------------------------|
| Number of conductors    | Nominal conductor cross-section |
| no                      | mm <sup>2</sup>                 |
| 1                       | 16 ÷ 400                        |
| 2 - 5                   | 1 ÷ 240                         |
| 7 - 19                  | 1; 1.5; 2.5 i 4                 |
| 24 - 40                 | 1; 1.5; 2.5                     |

|                                                               |                           |                             |                                                              |
|---------------------------------------------------------------|---------------------------|-----------------------------|--------------------------------------------------------------|
| Operating voltage                                             | 0.6/1 kV                  | Operating temperature range |                                                              |
| Voltage test                                                  | 4.0 kV rms                | during operation            | from -15 to +90°C                                            |
| Insulation resistivity at 90°C, minimum                       | 1 x 10 <sup>11</sup> Ω·cm | during installation         | from -5 to +70°C                                             |
| Inductance, approximate                                       | 0.7 mH/km                 | Minimum bending radius      | 12 x cable diameter                                          |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |                           | Cable combustibility        | flame retardant                                              |
| pH, approximate                                               | 6.8                       | Circuit integrity *         |                                                              |
| conductivity, approximate                                     | 0.4 μS/mm                 | E90                         | DIN 4102-12                                                  |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |                           | PH90                        | PN-EN 50200 or PN-EN 50362                                   |
| light transmittance, minimum                                  | 94%                       | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11                                   |
|                                                               |                           | Combustibility tests        | PN-EN 50266-2-4, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362 |
|                                                               |                           | Reference standards         | AT-0603-0064/2006, WT-TK-44                                  |
|                                                               |                           |                             | DIN VDE 0266                                                 |
|                                                               |                           |                             | PN-HD 604 S1                                                 |

\* Circuit integrity is dependent on installation method.

CE = the cable meets requirements of the low voltage directive 2006/95/WE

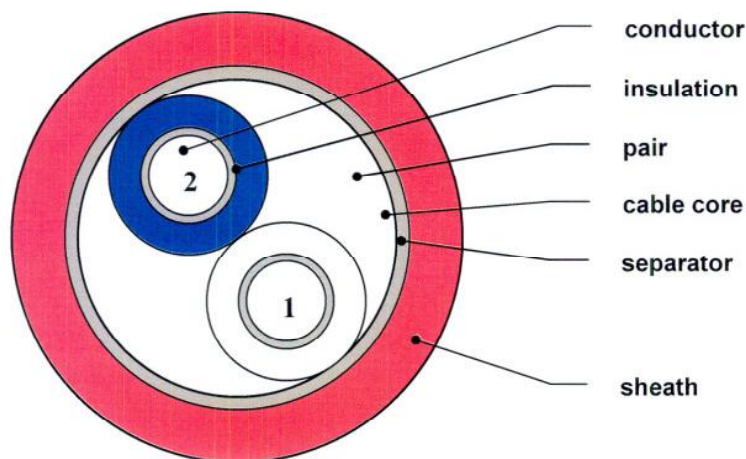
| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 3 x 1,5RE/1,5                                  | 16,6                         | 43,2         | 360                  |
|             | 3 x 2,5 RE/2,5                                 | 17,7                         | 72           | 430                  |
|             | 3 x 4,0 RE/4,0                                 | 18,8                         | 115          | 520                  |
|             | 3 x 6,0 RE/6,0                                 | 20,8                         | 173          | 660                  |
|             | 3 x 10 RE/10                                   | 23,8                         | 288          | 940                  |
|             | 3 x 16 RE/16                                   | 26,2                         | 461          | 1340                 |
|             | 3 x 25 RM/16                                   | 30,4                         | 720          | 1750                 |
|             | 3 x 35 RM/16                                   | 33,0                         | 1190         | 2160                 |
|             | 3 x 50 RM/25                                   | 37,0                         | 1723         | 2840                 |
|             | 4 x 1,5RE/1,5                                  | 16,8                         | 81           | 390                  |
|             | 4 x 2,5 RE/2,5                                 | 19,0                         | 96           | 500                  |
|             | 4 x 4,0 RE/4,0                                 | 20,1                         | 154          | 600                  |

RE - single wire round conductor;  
RM - multiwire round conductor

| Article No. | Number of conductors x conductor cross-section | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-------------|------------------------------------------------|------------------------------|--------------|----------------------|
|             | mm <sup>2</sup>                                | mm                           | kg/km        | kg/km                |
|             | 4 x 6,0 RE/6,0                                 | 22,3                         | 230          | 770                  |
|             | 4 x 10 RE/10                                   | 25,1                         | 384          | 1140                 |
|             | 4 x 16 RE/16                                   | 26,2                         | 614          | 1340                 |
|             | 4 x 25 RM/16                                   | 32,8                         | 960          | 2100                 |
|             | 4 x 35 RE/16                                   | 35,6                         | 1498         | 2610                 |
|             | 4 x 50 RM/25                                   | 35,4                         | 2160         | 2950                 |
|             | 7 x 1,5RE/2,5                                  | 20,7                         | 101          | 580                  |
|             | 7 x 2,5 RE/2,5                                 | 21,9                         | 168          | 690                  |
|             | 12 x 1,5RE/2,5                                 | 25,9                         | 101          | 935                  |
|             | 12 x 2,5 RE/4,0                                | 27,9                         | 168          | 1150                 |

Other cross-sections and conductor counts available on request.

|                                                                                                                                                    |                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
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| Dokument č. / Document No. <b>FIRE-FR-005-09-AWE</b>                                                                                               |                                                                                                           |
| Příloha č./Appendix No. <b>23</b>                                                                                                                  |                                                                                                           |

**FIRE RESISTANT HALOGEN FREE CABLES****APPLICATIONS**

**HTKSH FE180 PH90/E30-E90** fire resistant and halogen free cables are intended for installation in alarm, signalling, transmission, sound warning and similar systems, also for data processing systems and for analogue or digital data transmission in industrial electronics and control applications in objects of sharp fire protection requirements, particularly in fire alarm and fire automatic control systems.

Halogen free cables are applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – data are transmitted and power is supplied to equipment which must operate in fire conditions and during fire fighting (e.g. emergency lighting). The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

The cables are suitable for indoor installations.

**CONSTRUCTION**

|                   |   |                                                                                                                                    |
|-------------------|---|------------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>  | – | bare copper, solid,                                                                                                                |
| <b>insulation</b> | – | mica tape and halogen free compound insulation - colours in accordance with PN-92/T-90321 standard,                                |
| <b>pair</b>       | – | insulated conductors twisted into pairs,                                                                                           |
| <b>cable core</b> | – | pairs laid-up into a cable core,                                                                                                   |
| <b>separator</b>  | – | polyester tape,                                                                                                                    |
| <b>sheath</b>     | – | red, cable sheath made of halogen free compound according to EN 50290-2-27 and VDE 0250-214 – HM2, (oxygen index bigger than 35%). |

# HTKSH FE180 PH90/E30-E90

## CHARACTERISTICS

The cables maintain their functions for 90 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

|                                         |                 |       |      |      |      |     |     |
|-----------------------------------------|-----------------|-------|------|------|------|-----|-----|
| Conductor diameter                      | mm              | 0.8   | 1.0  | 1.4  | 1.8  | 2.3 | 2.8 |
| Conductor cross-section                 | mm <sup>2</sup> | 0.5   | 0.75 | 1.5  | 2.5  | 4   | 6   |
| DC loop resistance at 20°C, maximum     | Ω/km            | 75    | 48   | 24.5 | 14.9 | 9.3 | 6.3 |
| Capacitance between conductors at 1 kHz | maximum         | nF/km | 120  | 120  | 120  | 120 | 120 |
|                                         | average         |       | 60   | 70   | 70   | 100 | 100 |

|                                                               |            |                             |                            |
|---------------------------------------------------------------|------------|-----------------------------|----------------------------|
| Operating voltage                                             | 240 V      | Operating temperature range |                            |
| Voltage test                                                  | 1.5 kV rms | during operation            | from - 30 to + 80°C        |
| Insulation resistance, minimum                                | 100 MΩ·km  | during installation         | from - 5 to + 70°C         |
| Inductance, approximate                                       | 0.7 mH/km  | Minimum bending radius      | 10 x cable diameter        |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |            | Cable combustibility        | flame retardant            |
| pH, approximate                                               | 6.8        | Combustibility tests        | PN-EN 60332-1-2            |
| conductivity, approximate                                     | 0.4 μS/mm  | Circuit integrity *         |                            |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |            | E30-E90                     | DIN 4102-12                |
| light transmittance, minimum                                  | 94%        | PH90                        | PN-EN 50200 or EN 50362    |
|                                                               |            | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11 |
|                                                               |            | Reference standards         | WT-TK-43                   |
|                                                               |            |                             | PN-92/T-90320              |
|                                                               |            |                             | PN-92/T-90321              |

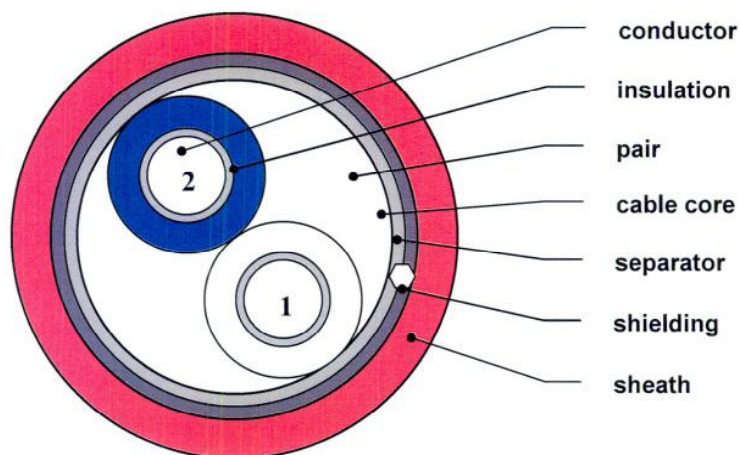
\* Circuit integrity is dependent on installation method.

CE = the cable meets requirements of the low voltage directive 2006/95/WE

| Cable type               | Number of pairs (x 2) x conductor diameter | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|--------------------------|--------------------------------------------|------------------------------|--------------|----------------------|
|                          | mm                                         | mm                           | kg/km        | kg/km                |
| HTKSH FE180 PH90/E30-E90 | 1 x 2 x 0.8                                | 6.5                          | 15           | 61                   |
| HTKSH FE180 PH90/E30-E90 | 1 x 2 x 1.0                                | 7.7                          | 20           | 70                   |

Other diameters and conductor counts available on request.

|                                                                                                                                                     |                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
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|                                                                                                                                                     | 16.07.2009         |
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|                                                                                                                                                     | <i>[Signature]</i> |
| Dokument č. / Document No. <i>FIRES-FR-004-09-AVE</i>                                                                                               |                    |
| Príloha č./Appendix No. <i>25</i>                                                                                                                   |                    |

**HTKSHekw FE180 PH90/E30-E90****FIRE RESISTANT HALOGEN FREE CABLES****APPLICATIONS**

HTKSHekw FE180 PH90/E30-E90 fire resistant and halogen free cables are intended for installation in alarm, signalling, transmission, sound warning and similar systems, also for data processing systems and for analogue or digital data transmission in industrial electronics and control applications in objects of sharp fire protection requirements, particularly in fire alarm and fire automatic control systems.

Halogen free cables are applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required.

**Functions of the cables are maintained** – data are transmitted and power is supplied to equipment which must operate in fire conditions and during fire fighting (e.g. emergency lighting). The cables are flame retardant and their smoke emission is low, emitted fumes are non toxic and non corrosive.

Cable circuits are protected by an overall electrostatic shield against external electric field interferences.

The cables are suitable for indoor installations.

**CONSTRUCTION**

|                   |   |                                                                                                                                    |
|-------------------|---|------------------------------------------------------------------------------------------------------------------------------------|
| <b>conductor</b>  | – | bare copper, solid,                                                                                                                |
| <b>insulation</b> | – | mica tape and halogen free compound insulation - colours in accordance with PN-92/T-90321 standard,                                |
| <b>pair</b>       | – | insulated conductors twisted into pairs,                                                                                           |
| <b>cable core</b> | – | pairs laid-up into a cable core,                                                                                                   |
| <b>separator</b>  | – | polyester tape,                                                                                                                    |
| <b>shielding</b>  | – | overall electrostatic shield incorporating a plastic laminated metal foil and a tinned copper drain wire Ø 0.8 mm,                 |
| <b>sheath</b>     | – | red, cable sheath made of halogen free compound according to EN 50290-2-27 and VDE 0250-214 – HM2, (oxygen index bigger than 35%). |

# HTKSHekw FE180 PH90/E30-E90

## CHARACTERISTICS

The cables maintain their functions for 90 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

|                                         |                 |       |      |      |      |     |     |
|-----------------------------------------|-----------------|-------|------|------|------|-----|-----|
| Conductor diameter                      | mm              | 0.8   | 1.0  | 1.4  | 1.8  | 2.3 | 2.8 |
| Conductor cross-section                 | mm <sup>2</sup> | 0.5   | 0.75 | 1.5  | 2.5  | 4   | 6   |
| DC loop resistance at 20°C, maximum     | Ω/km            | 75    | 48   | 24.5 | 14.9 | 9.3 | 6.3 |
| Capacitance between conductors at 1 kHz | maximum         | nF/km | 200  | 200  | 200  | 200 | 200 |
|                                         | average         |       | 90   | 130  | 130  | 150 | 150 |

|                                                               |            |                             |                            |
|---------------------------------------------------------------|------------|-----------------------------|----------------------------|
| Operating voltage                                             | 240 V      | Operating temperature range |                            |
| Voltage test                                                  | 1.5 kV rms | during operation            | from - 30 to + 80°C        |
| Insulation resistance, minimum                                | 100 MΩ·km  | during installation         | from - 5 to + 70°C         |
| Inductance, approximate                                       | 0.7 mH/km  | Minimum bending radius      | 10 x cable diameter        |
| Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 |            | Cable combustibility        | flame retardant            |
| pH, approximate                                               | 6.8        | Combustibility tests        | PN-EN 60332-1-2            |
| conductivity, approximate                                     | 0.4 μS/mm  | Circuit integrity *         |                            |
| Smoke density per PN-EN 50268-2-3, IEC 61034-2                |            | E30-E90                     | DIN 4102-12                |
| light transmittance, minimum                                  | 94%        | PH90                        | PN-EN 50200 or EN 50362    |
|                                                               |            | Insulation integrity FE180  | IEC 60331-21; IEC 60331-11 |
|                                                               |            | Reference standards         | WT-TK-43                   |
|                                                               |            |                             | PN-92/T-90320              |
|                                                               |            |                             | PN-92/T-90321              |

\* Circuit integrity is dependent on installation method.

CE = the cable meets requirements of the low voltage directive 2006/95/WE

| Cable type                  | Number of pairs (x 2) x conductor diameter | Cable outer diameter (appr.) | Copper index | Cable weight (appr.) |
|-----------------------------|--------------------------------------------|------------------------------|--------------|----------------------|
|                             | mm                                         | mm                           | kg/km        | kg/km                |
| HTKSHekw FE180 PH90/E30-E90 | 1 x 2 x 0.8                                | 7.4                          | 15           | 66                   |
| HTKSHekw FE180 PH90/E30-E90 | 1 x 2 x 1.0                                | 7.8                          | 20           | 75                   |

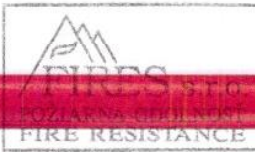
Other diameters and conductor counts available on request.

|                                                                                                                                              |                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
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|                                                                                                                                              | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. / Document No. FIRES-FR-004-09-AWE                                                                                               |                                        |
| Príloha č./Appendix No. 28                                                                                                                   |                                        |

**HDGs(żo) FE180 PH90/E30-E90, HDGsekw(żo) FE180 PH90/E30-E90  
HLGs(żo) FE180 PH90/E30-E90, HLGsekw(żo) FE180 PH90/E30-E90**

strona 1 z 2

**PRZEWODY ELEKTROENERGETYCZNE OGNIODPORNE, BEZHALOGENOWE**

|                                                                                   |                                        |
|-----------------------------------------------------------------------------------|----------------------------------------|
|  | Dátum/Date<br><i>16.01.2009</i>        |
|                                                                                   | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-01-AWE</i>                            |                                        |
| Príloha č./Appendix No. <i>28</i>                                                 |                                        |

**ZASTOSOWANIE**

Przewody elektroenergetyczne ogniodporne i bezhalogenowe typu **HDGs(żo) FE180 PH90/E30-E90 300/500 V**, **HLGs(żo) FE180 PH90/E30-E90 300/500 V** i ekranowane typu **HDGsekw(żo) FE180 PH90/E30-E90 300/500 V**, **HLGsekw(żo) FE180 PH90/E30-E90 300/500 V**, przeznaczone są do zasilania instalacji w obiektach o podwyższonych wymaganiach przeciwpożarowych, tj. zapewnienie dopływu energii elektrycznej do urządzeń, których działanie jest niezbędne podczas pożaru oraz jego gaszenia. Kable nie rozprzestrzeniają płomienia, emisja dymu jest bardzo niska, a emitowane gazy są nietoksyczne i niekorozyjne. Przewody zaleca się stosować w instalacjach oświetlenia awaryjnego, systemach oddymiania oraz mogą być stosowane w systemach alarmowych, sygnalizacyjnych, kontrolnych, DSO i innych urządzeniach przeciwpożarowych, których działanie przewidziane jest w warunkach pożaru.

W przypadku kabli ekranowanych (**ekw**) wspólny ekran statyczny chroni kabel przed zakłóceniami indukowanymi przez zewnętrzne pola elektryczne.

Kable bezhalogenowe używane są tam, gdzie potrzebne jest większe bezpieczeństwo ludzi i kosztownych urządzeń elektronicznych na wypadek pożaru.

W przypadku pożaru, **kable te zapewniają podtrzymanie funkcji kabla** (tj. zapewnienie transmisji danych oraz dopływu energii elektrycznej do urządzeń, które muszą funkcjonować w warunkach pożaru oraz podczas jego gaszenia np. instalacje oświetlenia awaryjnego). Kable nie rozprzestrzeniają płomienia, emisja dymu jest bardzo niska, a emitowane gazy są nietoksyczne i niekorozyjne.

**BUDOWA**

- żyły jednodrutowe (**D**) lub wielodrutowe (**L**) z miękkich drutów miedzianych gołych lub ocynowanych, klasy 1,2 lub 5 wg PN-EN 60228,
- izolacja żył wykonana ze specjalnej usieciowanej gumy silikonowej,
- kolory izolacji żył wg normy PN-HD 308 S2,

| Liczba żył    | Barwy izolacji żył w przewodzie                  |                                             |
|---------------|--------------------------------------------------|---------------------------------------------|
|               | z żyłą ochronną (żo)                             | bez żyły ochronnej                          |
| 2             | -                                                | niebieska i brązowa                         |
| 3             | zielono-żółta, niebieska, brązowy                | brązowa, czarna i szara                     |
| 4             | zielono-żółta, niebieska, brązowa, czarna        | czarna, niebieska i brązowa                 |
| 5             | zielono-żółta, niebieska, brązowa, czarna, szara | czarna, niebieska, brązowa, czarna i czarna |
| powyżej 5 żył | żyły numerowane                                  |                                             |

- żyły izolowane skręcone razem w warstwy o przeciwnych kierunkach skrętu,
- ośrodek kabla owinięty taśmą poliestrową dla przewodów HDGsekw i HLGsekw,
- ekran statyczny dla przewodów HDGsekw i HLGsekw z laminowanej tworzywem folii aluminiowej, z ocynowaną żyłą uziemiającą,
- powłoka kabla wykonana z tworzywa bezhalogenowego, w kolorze czerwonym.

# HDGs(żo) FE180 PH90/E30-E90, HDGsekw(żo) FE180 PH90/E30-E90 HLGs(żo) FE180 PH90/E30-E90, HLGsekw(żo) FE180 PH90/E30-E90

strona 2 z 2

## DANE TECHNICZNE

Kable zapewniają podtrzymanie funkcji elektrycznych instalacji przez 90 minut przy napięciu znamionowym:

- 300/500 V wg PN-EN 50200 lub EN 50362,
- 110 V wg DIN 4102-12

|                                                    |                 |      |      |      |      |      |      |
|----------------------------------------------------|-----------------|------|------|------|------|------|------|
| Średnica żyły (klasa 1 lub 2), około               | mm              | 1,0  | 1,1  | 1,4  | 1,8  | 2,3  | 2,8  |
| Przekrój żyły (klasa 5)                            | mm <sup>2</sup> | 0,75 | 1    | 1,5  | 2,5  | 4    | 6    |
| Maksymalna rezystancja żył w temp. 20°C            | Ω/km            | 26,0 | 19,5 | 13,3 | 7,98 | 4,95 | 3,30 |
| Pojemność pomiędzy żyłami przy 1 kHz, – maksymalna | nF/km           | 120  | 120  | 120  | 120  | 120  | 120  |
| – średnia                                          |                 | 70   | 70   | 80   | 80   | 100  | 100  |

|                                                                                          |                                           |                                      |                                         |
|------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------|-----------------------------------------|
| Napięcie pracy $U_0/U$                                                                   | 300/500 V                                 | Korozyjność wydzieli. gazów          | PN-EN 50267-2-3, IEC 60754-2            |
| Próba napięciowa                                                                         | 2 kV sk                                   | pH, min.                             | 4,3                                     |
| Minimalna rezystancja izolacji w temp. 20°C                                              | 100 MΩ·km                                 | konduktywność, max.                  | 10 μS/cm                                |
| Indukcyjność, około                                                                      | 0,7 mH/km                                 | Gęstość dymu                         | PN-EN 50268-2-3, IEC 61034-2            |
| Maksymalna dopuszczalna temperatura przy żyłach w warunkach pracy przy zwarciu (max.5 s) | + 85°C<br>+ 250°C                         | przepuszczalność światła, min.       | 60 %                                    |
| Zakres temperatur pracy podczas pracy podczas układania                                  | od - 25 do + 85°C<br>od -10 do + 50°C     | Palność kabla                        | nie rozprzestrzeniający płomienia       |
| Minimalny promień gięcia kable jednożyłowe kable wielożyłowe                             | 10 x średnica kabla<br>6 x średnica kabla | Próby palności Podtrzymanie funkcji: | PN-EN 50266-2-2, IEC 60332-3-22 (cat.A) |
|                                                                                          |                                           | E30-E90 PH90                         | DIN 4102-12<br>PN-EN 50200 lub EN 50362 |
|                                                                                          |                                           | Trwałość izolacji FE180              | IEC 60331-21; IEC 60331-11              |
|                                                                                          |                                           | Wykonanie wg normy                   | WT-TK-46                                |

Instalacja kabla - powinna być przeprowadzona na certyfikowanym systemie prowadzenia kabli. Zalecamy stosowanie tylko certyfikowanych systemów nośnych wg normy DIN 4102 część 12. Obecnie posiadamy badania przeprowadzone na systemach firm BAKS. Odstęp pomiędzy podporami dla koryt i drabinek nie mogą być większe niż 1500 mm. Odstęp pomiędzy instalowanymi uchwytami i obejmami co 300 lub 600 mm.

**CE = przewód spełnia wymagania dyrektywy niskonapięciowej 2006/95/WE**

| Symbol wyrobu | Liczba x średnica żył | Średnica zewnętrzna (około) | Indeks miedziowy | Masa kabla (około) |
|---------------|-----------------------|-----------------------------|------------------|--------------------|
|               | mm                    | mm                          | kg/km            | kg/km              |
| HDGs          | 2 x 0,75              | 6,4                         | 14,4             | 50                 |
| HDGs          | 2 x 1                 | 6,6                         | 19,2             | 55                 |
| HDGs          | 2 x 1,5               | 7,5                         | 28,8             | 75                 |
| HDGs          | 2 x 2,5               | 8,9                         | 48               | 105                |
| HDGs          | 2 x 4                 | 9,8                         | 77               | 140                |
| HDGs          | 2 x 6                 | 11,6                        | 115              | 200                |
| HDGs          | 3 x 0,75              | 7,1                         | 21,6             | 68                 |
| HDGs          | 3 x 1                 | 7,2                         | 28,8             | 70                 |
| HDGs          | 3 x 1,5               | 8,2                         | 43,2             | 95                 |
| HDGs          | 3 x 2,5               | 9,7                         | 72               | 140                |
| HDGs          | 3 x 4                 | 10,9                        | 115              | 200                |
| HDGs          | 3 x 6                 | 12,8                        | 173              | 280                |
| HDGs          | 4 x 0,75              | 6,4                         | 28,8             | 60                 |
| HDGs          | 4 x 1                 | 7,6                         | 38,4             | 90                 |

| Symbol wyrobu | Liczba x średnica żył | Średnica zewnętrzna (około) | Indeks miedziowy | Masa kabla (około) |
|---------------|-----------------------|-----------------------------|------------------|--------------------|
|               | mm                    | mm                          | kg/km            | kg/km              |
| HDGs          | 4 x 1,5               | 8,9                         | 58               | 125                |
| HDGs          | 4 x 2,5               | 10,4                        | 96               | 185                |
| HDGs          | 4 x 4                 | 11,5                        | 154              | 250                |
| HDGs          | 4 x 6                 | 13,7                        | 230              | 360                |
| HDGs          | 5 x 0,75              | 6,5                         | 36               | 68                 |
| HDGs          | 5 x 1                 | 8,5                         | 48               | 110                |
| HDGs          | 5 x 1,5               | 9,9                         | 72               | 155                |
| HDGs          | 5 x 2,5               | 11,4                        | 120              | 220                |
| HDGs          | 5 x 4                 | 12,6                        | 192              | 305                |
| HDGs          | 5 x 6                 | 15,1                        | 288              | 450                |

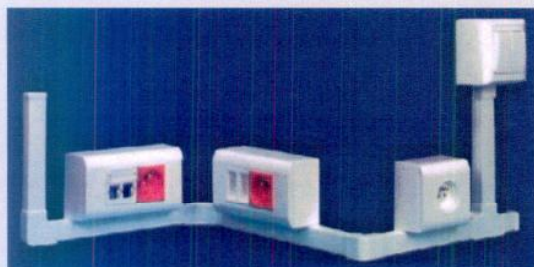
Na zamówienie klienta wykonujemy przewody o innych średnicach i innej liczbie żył.

|                                          |                                                        |
|------------------------------------------|--------------------------------------------------------|
| <br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16. 07. 2009                             |
|                                          | Podpis/Signature<br><i>[Signature]</i>                 |
|                                          | Dokument č. / Document No. <i>FIRES-FR-009-09-ANKE</i> |
| Príloha č./Appendix No. <i>19</i>        |                                                        |

|                                                                                    |                                                  |
|------------------------------------------------------------------------------------|--------------------------------------------------|
|  | Dátum/Date<br>16.01.2009                         |
|                                                                                    | Podpis/Signature<br><i>[Signature]</i>           |
|                                                                                    | Dokument č. FIRES-FR-005-09-ALWE<br>Document No. |
| Příloha č./Appendix No. 30                                                         |                                                  |

## Kanały Kablówé Elektroinstalacyjné LS, KS i KP Emiter

### PODSTAWOWE CECHY KANAŁÓW KABLOWYCH BEZHAŁOGENOWYCH



Kanały kablówé, elektroinstalacyjne LS, KS i KP przeznaczone s do prowadzenia małych, średnich i dużych instalacji elektrycznych i teleinformatycznych.

Montaż osprzętu, w kanałach LS i KS, proponujemy w obudowach natynkowych systemu Emiter (OBUK) lub podstawach natynkowych zalecanych przez innych producentów.

Montaż osprzętu 45x45, w kanałach KP, proponujemy bezpośrednio w kanale przy wykorzystaniu uchwytów szybkiego montażu UCHKP.

### PARAMETRY TECHNICZNE CHARAKTERYZUJĄCE KANAŁY KABLOWE

| Klasyfikacja ze względu na:                                     | Opis/cechowanie:                                                                                                                                       |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Materiał                                                        | Modyfikowany poliolefin, klasa palności V-0, kolor naturalny                                                                                           |
| Własności mechaniczne                                           | Listwy dla średnich narażeń mechanicznych (odporność na uduy 2J)                                                                                       |
| Odporność na temperaturę                                        | Temperatura montażu: minimalna -5°C maksymalna +60°C<br>Temperatura pracy: minimalna -45°C maksymalna +90°C                                            |
| Odporność na rozprzestrzenianie płomienia                       | Nie rozprzestrzeniają płomienia, po odjęciu źródła ognia listwa gaśnie                                                                                 |
| Ochronę przed ciałami stałymi i pyłem oraz przed wnikaniem wody | IP 30<br>– listwy chronią przed przedostaniem się do ich wnętrza ciał obcych o średnicy 2,5 mm i większej<br>– listwy nie chronią przed wnikaniem wody |

Kanały kablówé LS i KS spełnia wymagania zawarte w normie PN-EN 50085-1, 2001,

| symbol (szer x wys) | nazwa                                 | ilość w opakowaniu | waga          |
|---------------------|---------------------------------------|--------------------|---------------|
| LS 15x10            | kanal elektroinstalacyjny LS 15x10    | 25szt.             | 0,180 kg/szt. |
| LS 12x12            | kanal elektroinstalacyjny LS 12x12    | 25szt.             | 0,168 kg/szt. |
| LS 20x12            | kanal elektroinstalacyjny LS 20x12    | 25szt.             | 0,280 kg/szt. |
| LS 25x12            | kanal elektroinstalacyjny LS 25x12    | 25szt.             | 0,320 kg/szt. |
| LS 17x15            | kanal elektroinstalacyjny LS 17x15    | 25szt.             | 0,240 kg/szt. |
| LS 20x18            | kanal elektroinstalacyjny LS 20x18    | 25szt.             | 0,320 kg/szt. |
| LS 25x18            | kanal elektroinstalacyjny LS 25x18    | 10szt.             | 0,320 kg/szt. |
| LS 35x18            | kanal elektroinstalacyjny LS 35x18    | 10szt.             | 0,450 kg/szt. |
| LS 35x18 P          | kanal elektroinstalacyjny LS 35x18 P  | 10szt.             | 0,490 kg/szt. |
| LS 50x18            | kanal elektroinstalacyjny LS 50x18    | 10szt.             | 0,760 kg/szt. |
| LS 50x18 P          | kanal elektroinstalacyjny LS 50x18 P  | 10szt.             | 0,800 kg/szt. |
| LS 60x18 2P         | kanal elektroinstalacyjny LS 60x18 2P | 10szt.             | 0,760 kg/szt. |
| LS 40x25            | kanal elektroinstalacyjny LS 40x25    | 10szt.             | 0,580 kg/szt. |
| LS 35x30            | kanal elektroinstalacyjny LS 35x30    | 10szt.             | 0,560 kg/szt. |
| LS 50x30 P          | kanal elektroinstalacyjny LS 50x30 P  | 10szt.             | 0,940 kg/szt. |
| LS 40x40            | kanal elektroinstalacyjny LS 40x40    | 10szt.             | 0,760 kg/szt. |
| LS 60x40            | kanal elektroinstalacyjny LS 60x40    | 10szt.             | 1,000 kg/szt. |
| LS 60x40 P          | kanal elektroinstalacyjny LS 60x40 P  | 10szt.             | 1,002 kg/szt. |
| KS 90x40            | kanal elektroinstalacyjny KS 90x40    | 4szt.              | 1,580 kg/szt. |
| KS 90x40 P          | kanal elektroinstalacyjny KS 90x40 P  | 4szt.              | 1,640 kg/szt. |
| KS 90x60            | kanal elektroinstalacyjny KS 90x60    | 4szt.              | 1,940 kg/szt. |
| KP 90x40            | kanal elektroinstalacyjny KP 90x40 Bi | 4szt.              | 2,060 kg/szt. |
| KP 90x60            | kanal elektroinstalacyjny KP 90x60    | 4szt.              | 2,940 kg/szt. |
| KP 110x60           | kanal elektroinstalacyjny KP 110x60   | 4szt.              | 3,100 kg/szt. |
| KP 130x60           | kanal elektroinstalacyjny KP 130x60   | 4szt.              | 3,300 kg/szt. |



**Badanie trasy kablowej BAKS - TECHNOKABEL**  
**Badanie w FIRES Słowacja Data 12-16.01.2009**

| Nr | Nr FIRES | Czas | Symbol kaba                           | Pozycja | Konstrukcja mocowania,<br>odległość, obciążenie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|----------|------|---------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | 47       |      | NHXXH-J 4x1.5 RE FE180 PH90/E90       | 1       | <p>Korytko kablowe KCOD 400H60/...<br/> B-400 1.5 m /10kg/m / grubość blachy 1,2 mm<br/> Mocowanie : Wysięgnik WFLO 500 ( pionowo)<br/> Wysięgnik WFLO 400 , pręt gwintowany PGM10/...,<br/> do betonu za pomocą tulei TRSO M10.</p> <div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> <div style="text-align: center;"> <br/> <b>FIRES S.R.O.</b><br/> <b>POŽIARNA ODOLNOST'</b><br/> <b>FIRE RESISTANCE</b> </div> <div style="text-align: right;"> Datum/Date<br/> 16.01.2009<br/> <br/> Podpis/Signature<br/> <i>[Signature]</i> </div> </div> <p>Dokument č. <i>FIRES-FR-004-09-AWE</i><br/> Document No.</p> |
| 2  | 46       |      | NHXXH-J 4x1,5 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3  | 45       |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4  | 44       |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 5  | 70B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6  | 70A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 7  | 69B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 8  | 69A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 9  | 68B      |      | HDGsekwżo 3x2,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 10 | 68A      |      | HDGsekwżo 3x2,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 11 | 43       |      | NHXXH-J 4x1,5 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 12 | 42       |      | NHXXH-J 4x1,5 RE FE180 PH90/E90       | 2       | <p>Drabinka kablowa DUOP 400H60/... <i>30</i><br/> B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br/> Mocowanie : Wysięgnik WFLO 500 ( pionowo)<br/> Wysięgnik WFLO 400 , pręt gwintowany PGM10/...,<br/> do betonu za pomocą tulei TRSO M10.<br/> Rozstaw szczelbi co 300mm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 13 | 41       |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 14 | 40       |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 15 | 67B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 16 | 67A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 17 | 66B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18 | 66A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19 | 65B      |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 20 | 65A      |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 21 | 39       |      | NHXXH 4x1,5/1,5 RE FE180 PH30/E30     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 22 |          |      | NHXXH 4x1,5/1,5 RE FE180 PH30/E30     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 23 | 38       |      | NHXXH 4x50/25 RE FE180 PH30/E30       | 3       | <p>Korytko kablowe KCOD 400H60/...<br/> B-400 1.5 m /10kg/m / grubość blachy 1,2 mm<br/> Mocowanie : Wysięgnik WFLO 500 ( pionowo)<br/> Wysięgnik WFLO 400 , pręt gwintowany PGM10/...,<br/> do betonu za pomocą tulei TRSO M10.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 24 |          |      | NHXXH 4x50/25 RE FE180 PH30/E30       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 25 | 37       |      | NHXXH-J 4x1,5 RE FE180 PH30/E30       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 26 |          |      | NHXXH-J 4x1,5 RE FE180 PH30/E30       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 27 |          |      |                                       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 28 |          |      |                                       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 29 | 29       |      | NHXXH-J 4x1,5 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 30 |          |      | NHXXH-J 4x1,5 RE FE180 PH90/E90       | 4       | <p>Drabinka kablowa DUOP 400H60/...<br/> B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br/> Mocowanie : uchwyty UTMO i wysięgnikach<br/> WMCO 300 do betonu za pomocą kołków<br/> rozporowych PSRO M10x 80<br/> Rozstaw szczelbi co 300mm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 31 | 28       |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 32 |          |      | NHXXH-J 4x50 RM FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 33 | 62B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 34 |          |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 35 | 62A      |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 36 |          |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 37 |          |      |                                       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 38 |          |      |                                       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 39 | 27       |      | NHXXH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 40 | 26       |      | NHXXH 4x1,5/1,5 RE FE180 PH90/E90     | 5       | <p>Drabinka kablowa DGOP 400H60/...<br/> B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br/> Mocowanie : uchwyty UTMO i wysięgnikach<br/> WMCO 300 do betonu za pomocą kołków<br/> rozporowych PSRO M10x 80<br/> Rozstaw szczelbi co 150mm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 41 | 25       |      | NHXXH 4x50/25 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 42 | 24       |      | NHXXH 4x50/25 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 43 | 61B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 44 |          |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 45 | 61A      |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 46 |          |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Nr | Nr FIRES | Czas | Symbol kaba                           | Pozycja | Konstrukcja mocowania,<br>odległość, obciążenie                                                                                                                                                                                                          |
|----|----------|------|---------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 | 23       |      | NHXH-J 4x50 RM FE180 PH30/E30         | 6       | Korytko kablowe KCOD 400H60/...<br>B-400 1.5 m /10kg/m / grubość blachy 1,2 mm<br>Mocowanie : Wspornik WPCO... . Wysięgnik<br>WWSO 400 PGM10/..., , uchwyt USOV do betonu<br>za pomocą kołków rozporowych PSRO M10x 80.                                  |
| 48 |          |      | NHXH-J 4x50 RM FE180 PH30/E30         |         |                                                                                                                                                                                                                                                          |
| 49 | 22       |      | NHXCH 4x50/25 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 50 |          |      | NHXCH 4x50/25 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 51 | 21       |      | NHXCH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                                          |
| 52 |          |      | NHXCH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                                          |
| 53 | 20       |      | NHXH-J 4x50 RM FE180 PH30/E30         | 7       | Drabinka kablowa DUOP 400H60/...<br>B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br>Mocowanie : Wspornik WPCO... . Wysięgnik<br>WWSO 400 PGM10/..., , uchwyt USOV do betonu<br>za pomocą kołków rozporowych PSRO M10x 80.<br>Rozstaw szczelbi co 300mm. |
| 54 |          |      | NHXH-J 4x50 RM FE180 PH30/E30         |         |                                                                                                                                                                                                                                                          |
| 55 | 19       |      | NHXCH 4x50/25 RE FE180 PH30/E30       |         |                                                                                                                                                                                                                                                          |
| 56 |          |      | NHXCH 4x50/25 RE FE180 PH30/E30       |         |                                                                                                                                                                                                                                                          |
| 57 | 18       |      | NHXH-J 4x1,5 RE FE180 PH30/E30        |         |                                                                                                                                                                                                                                                          |
| 58 |          |      | NHXH-J 4x1,5 RE FE180 PH30/E30        |         |                                                                                                                                                                                                                                                          |
| 59 | 17       |      | NHXCH 4x1,5/1,5 RE FE180 PH30/E30     | 8       | Korytko kwasoodporne KCOJ 400H60/... -E<br>B-400 1.5 m /10kg/m / grubość blachy 1,0 mm<br>Mocowanie : PGM10/...-E, ceownik CWOP<br>40H40/05-E, uchwyt WPPOV-E do betonu za<br>pomocą kołków rozporowych PSRO M10x 80-E                                   |
| 60 |          |      | NHXCH 4x1,5/1,5 RE FE180 PH30/E30     |         |                                                                                                                                                                                                                                                          |
| 61 | 14       |      | NHXH-J 4x1,5 RE FE 180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 62 | 13       |      | NHXH-J 4x1,5 RE FE 180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 63 | 12       |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                                          |
| 64 | 11       |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                                          |
| 65 | 60B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      | 9       | Drabinka kwasoodporna DGOD 400H60/... -E<br>B-400 1.5 m /20kg/m / grubość blachy 1,2 mm<br>Mocowanie : PGM10/...-E, ceownik CWOP<br>40H40/05-E, uchwyt WPPOV-E do betonu za<br>pomocą kołków rozporowych PSRO M10x 80-E.<br>Rozstaw szczelbi co 150mm.   |
| 66 | 60A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                          |
| 67 | 59B      |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                          |
| 68 | 59A      |      | HDGszo 3x2,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                          |
| 69 | 58B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                          |
| 70 | 58A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                          |
| 71 | 10       |      | NHXCH 4x50/25 RE FE180 PH90/E90       | 10      | Uchwyty kablowe UEF i UDF. Mocowanie do<br>betonu co 600mm za pomocą kołka SRO M6x30                                                                                                                                                                     |
| 72 | 9        |      | NHXCH 4x50/25 RE FE180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 73 | 8        |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                                          |
| 74 | 7        |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                                          |
| 75 | 6        |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                                          |
| 76 | 5        |      | NHXH-J 4x1,5 RE FE 180 PH90/E90       |         |                                                                                                                                                                                                                                                          |
| 77 | 57B      |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 | 10      | Uchwyty kablowe UEF i UDF. Mocowanie do<br>betonu co 600mm za pomocą kołka SRO M6x30                                                                                                                                                                     |
| 78 | 57A      |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                          |
| 79 | 56B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                          |
| 80 | 56A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                                          |
| 81 | 55B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                          |
| 82 | 55A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                                          |
| 83 | 72B      |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    | 10      | Uchwyty kablowe UEF i UDF. Mocowanie do<br>betonu co 600mm za pomocą kołka SRO M6x30                                                                                                                                                                     |
| 84 |          |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    |         |                                                                                                                                                                                                                                                          |
| 85 | 72A      |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                          |
| 86 |          |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                          |
| 87 | 71B      |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                          |
| 88 |          |      | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                                          |
| 89 | 71A      |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    | 10      | Uchwyty kablowe UEF i UDF. Mocowanie do<br>betonu co 600mm za pomocą kołka SRO M6x30                                                                                                                                                                     |
| 90 |          |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    |         |                                                                                                                                                                                                                                                          |

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|--------------------------------------------------------------------------------------|----------------------------------------|
|  | Datum/Date<br>16.07.2009               |
|                                                                                      | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. FIRES-FR-009-09-AWE<br>Document No.<br>Priloha č./Appendix No. 33        |                                        |

| Nr  | Nr FIRES | Czas | Symbol kaba                           | Pozycja | Konstrukcja mocowania,<br>odległość, obciążenie                                                                                                                                                                                  |
|-----|----------|------|---------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 91  | 35       |      | NHXH-J 4x16 RM FE180 PH90/E90         | 11      | Mocowanie szczebla do betonu co 600 mm za pomocą kołka SRO M 6x30. Po 2,3 i 5 kabli w jednym uchwycie,<br>Uchwyt kablów UKO1 + Szczepel SDOC ....                                                                                |
| 92  |          |      | NHXH-J 4x16 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                  |
| 93  | -        |      | NHXH-J 4x16 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                  |
| 94  | 34       |      | NHXCH 4x16/16 RM FE180 PH90/E90       |         |                                                                                                                                                                                                                                  |
| 95  |          |      | NHXCH 4x16/16 RM FE180 PH90/E90       |         |                                                                                                                                                                                                                                  |
| 96  | 33       |      | NHXCH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                  |
| 97  |          |      | NHXCH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                  |
| 98  | -        |      | NHXCH 4x1,5/1,5 RE FE180 PH90/E90     |         |                                                                                                                                                                                                                                  |
| 99  | -        |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 100 | 32       |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 101 |          |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 102 | 64B      |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                  |
| 103 |          |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                  |
| 104 | -        |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                  |
| 105 | -        |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                  |
| 106 | -        |      | HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90 |         |                                                                                                                                                                                                                                  |
| 107 | 64A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 108 |          |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 109 | -        |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 110 | -        |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 111 | -        |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 112 | 16       |      | NHXCH 4x50/25 RE FE 180 PH90/E90      | 12      | Obejma zatraskowa OZO<br>Mocowanie do betonu co 600 mm za pomocą kołka GSO 6x40 .                                                                                                                                                |
| 113 |          |      | NHXCH 4x50/25 RE FE 180 PH90/E90      |         |                                                                                                                                                                                                                                  |
| 114 | 15       |      | NHXCH 4x1,5/1,5 RE FE 180 PH90/E90    |         |                                                                                                                                                                                                                                  |
| 115 |          |      | NHXCH 4x1,5/1,5 RE FE 180 PH90/E90    |         |                                                                                                                                                                                                                                  |
| 116 | 54B      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                  |
| 117 |          |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90   |         |                                                                                                                                                                                                                                  |
| 118 | 54A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      | 13      | Uchwyty kablów UEF<br>Mocowanie do betonu co 600mm za pomocą kołka KWBO 6x40 .                                                                                                                                                   |
| 119 |          |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90      |         |                                                                                                                                                                                                                                  |
| 120 | 4        |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 121 |          |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 122 | 3        |      | NHXH-J 4x50 RM FE180 PH90/E90         | 14      | Drabinka kablowa DGOP 400H60/...<br>B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br>Mocowanie : uchwyty UTMO do betonu za pomocą kołków rozporowych PSRO M8x 75.<br>Uchwyty kablów UKO1 co 600mm.<br>Rozstaw szczebli co 150mm. |
| 123 |          |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                  |
| 124 | 2        |      | NHXCH 4x1,5/1,5 RE FE180PH90/E90      |         |                                                                                                                                                                                                                                  |
| 125 |          |      | NHXCH 4x1,5/1,5 RE FE180PH90/E90      |         |                                                                                                                                                                                                                                  |
| 126 | 1        |      | NHXCH 4x50/25 RE FE180PH90/E90        | 15      | Drabinka kablowa DGOP 400H60/...<br>B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm<br>Mocowanie : uchwyty UTMO do betonu za pomocą kołków rozporowych PSRO M8x 75.<br>Uchwyty kablów UKO1 co 600mm.<br>Rozstaw szczebli co 150mm. |
| 127 |          |      | NHXCH 4x50/25 RE FE180PH90/E90        |         |                                                                                                                                                                                                                                  |
| 128 | 73B      |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    |         |                                                                                                                                                                                                                                  |
| 129 |          |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90    |         |                                                                                                                                                                                                                                  |
| 130 |          |      |                                       |         |                                                                                                                                                                                                                                  |
| 131 |          |      |                                       |         |                                                                                                                                                                                                                                  |
| 132 | 49       |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 133 |          |      | NHXH-J 4x1,5 RE FE180 PH90/E90        |         |                                                                                                                                                                                                                                  |
| 134 | 48       |      | NHXH-J 4x50 RM FE180 PH90/E90         | 15      |                                                                                                                                                                                                                                  |
| 135 |          |      | NHXH-J 4x50 RM FE180 PH90/E90         |         |                                                                                                                                                                                                                                  |

|                                                                                    |                                        |
|------------------------------------------------------------------------------------|----------------------------------------|
|  | Dátum/Date<br>16.01.2009               |
|                                                                                    | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-09-AWE</i>                             |                                        |
| Príloha č./Appendix No. <i>35</i>                                                  |                                        |

| Nr  | Nr FIRES | Czas | Symbol kaba                         | Pozycja | Konstrukcja mocowania,<br>odległość, obciążenie                                                                                    |
|-----|----------|------|-------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------|
| 136 | 75B      |      | HDGszo 3x2,5 RE FE180 PH90/E90      | 16      | Uchwyty kablowe UDF w listwie bezhalogenowej<br>Mocowanie do betonu co 300mm za pomocą kołka SROM6x30.                             |
| 137 | 75A      |      | HDGszo 3x2,5 RE FE180 PH90/E90      |         |                                                                                                                                    |
| 138 | 74B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    | 17      | Uchwyty kablowe UDF w listwie bezhalogenowej<br>Mocowanie do betonu co 300mm za pomocą kołka SROM6x30.                             |
| 139 | 74A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    |         |                                                                                                                                    |
| 140 | 73A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 | 18      | Uchwyty kablowe UDF w listwie bezhalogenowej<br>Mocowanie do betonu co 300mm za pomocą kołka SROM6x30.                             |
| 141 |          |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |         |                                                                                                                                    |
| 142 | 53B      |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90  | 19      | Uchwyty kablowe UDF w listwie bezhalogenowej<br>Mocowanie do betonu co 300mm za pomocą kołka SROM6x30.                             |
| 143 | 53A      |      | HDGszo 3x2,5 RE FE180 PH90/E30-E90  |         |                                                                                                                                    |
| 144 | 52B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    | 20      | Uchwyty kablowe UDF w listwie bezhalogenowej<br>Mocowanie do betonu co 300mm za pomocą kołka SROM6x30.                             |
| 145 | 52A      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    |         |                                                                                                                                    |
| 146 | 63B      |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    | 21      | Uchwyty kablowe KSA<br>Mocowanie do betonu co 600mm za pomocą tulei rozporowych TRSO M6 i pręta gwintowanego M6 lub kołka SROM6x30 |
| 147 |          |      | HTKSH 1x2x0,8 FE180 PH90/E30-E90    |         |                                                                                                                                    |
| 148 | 63A      |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |         |                                                                                                                                    |
| 149 |          |      | HTKSHekw 1x2x0,8 FE180 PH90/E30-E90 |         |                                                                                                                                    |
| 150 | 31       |      | NHXXH-J 4x50 RM FE180 PH90/E90      | 22      | Uchwyty kablowe KSA<br>Mocowanie do betonu co 600mm za pomocą tulei rozporowych TRSO M6 i pręta gwintowanego M6 lub kołka SROM6x30 |
| 151 |          |      | NHXXH-J 4x50 RM FE180 PH90/E90      |         |                                                                                                                                    |
| 152 | 30       |      | NHXXH-J 4x1,5 RE FE180 PH90/E90     |         |                                                                                                                                    |
| 153 |          |      | NHXXH-J 4x1,5 RE FE180 PH90/E90     |         |                                                                                                                                    |

### Zestawienie kabli

| Lp | Symbol kaba                           | Średnica kabla | Ciężar kabla | Ilość |
|----|---------------------------------------|----------------|--------------|-------|
| 1  | NHXXH-J FE 180 PH30/E30 4x 1,5 RE     | 15 mm          | 0,31 kg/m    | 4     |
| 2  | NHXXH-J FE 180 PH30/E30 4x 50 RM      | 32 mm          | 2,60 kg/m    | 4     |
| 3  | NHXCH FE 180 PH30/E30 4x 1,5/1,5 RE   | 16 mm          | 0,35 kg/m    | 4     |
| 4  | NHXCH FE 180 PH30/E30 4x 50/25 RM     | 35 mm          | 2,87 kg/m    | 4     |
| 5  | NHXXH-J FE 180 PH90/E90 4x 1,5 RE     | 16 mm          | 0,35 kg/m    | 19    |
| 6  | NHXXH-J FE 180 PH90/E90 4x 16 RM      | 25 mm          | 1,25 kg/m    | 3     |
| 7  | NHXXH-J FE 180 PH90/E90 4x 50 RM      | 33 mm          | 2,70 kg/m    | 16    |
| 8  | NHXCH FE 180 PH90/E90 4x 1,5/1,5 RE   | 17 mm          | 0,39 kg/m    | 11    |
| 9  | NHXCH FE 180 PH90/E90 4x 16/16 RM     | 26 mm          | 1,34 kg/m    | 2     |
| 10 | NHXCH FE 180 PH90/E90 4x 50/25 RM     | 36 mm          | 2,95 kg/m    | 10    |
| 11 | HTKSH FE180 PH90/E30-E90 1x2x0,8      | 7 mm           | 0,07 kg/m    | 23    |
| 12 | HTKSH ekw FE180 PH90/E30-E90 1x2x0,8  | 7 mm           | 0,06 kg/m    | 16    |
| 13 | HDGszo 3x2,5 RE FE180 PH90/E30-E90    | 10 mm          | 0,2 kg/m     | 16    |
| 14 | HDGsekwzo 3x2,5 RE FE180 PH90/E30-E90 | 10 mm          | 0,2 kg/m     | 14    |

Pozycja 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21 i 22 stal ocynkowana metodą Sendzimira PN-EN 10327

Pozycja 8, 9, 13 stal kwasoodporna PN-EN 10088 1.4301

|                                                                                                                                                     |                                                                                                           |
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| <br><b>FIRES S.T.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Datum/Date<br>16.01.2009                                                                                  |
|                                                                                                                                                     | Podpis/Signature<br> |
| Dokument №.<br>Document No. <b>FIRES-FR-004-09-ANNE</b>                                                                                             |                                                                                                           |
| Załącznik №./Appendix No. <b>35</b>                                                                                                                 |                                                                                                           |

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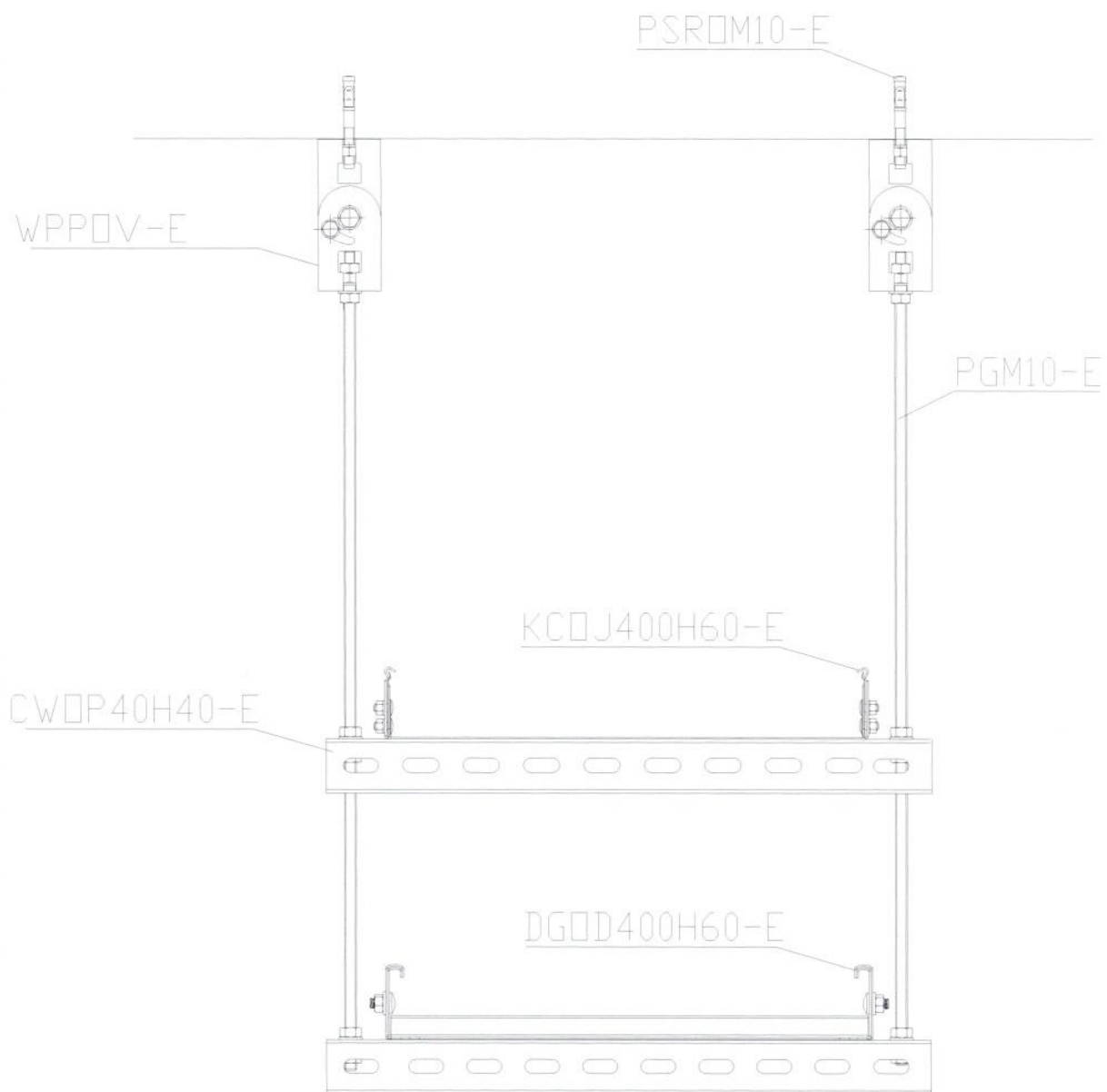
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DGOP400H60

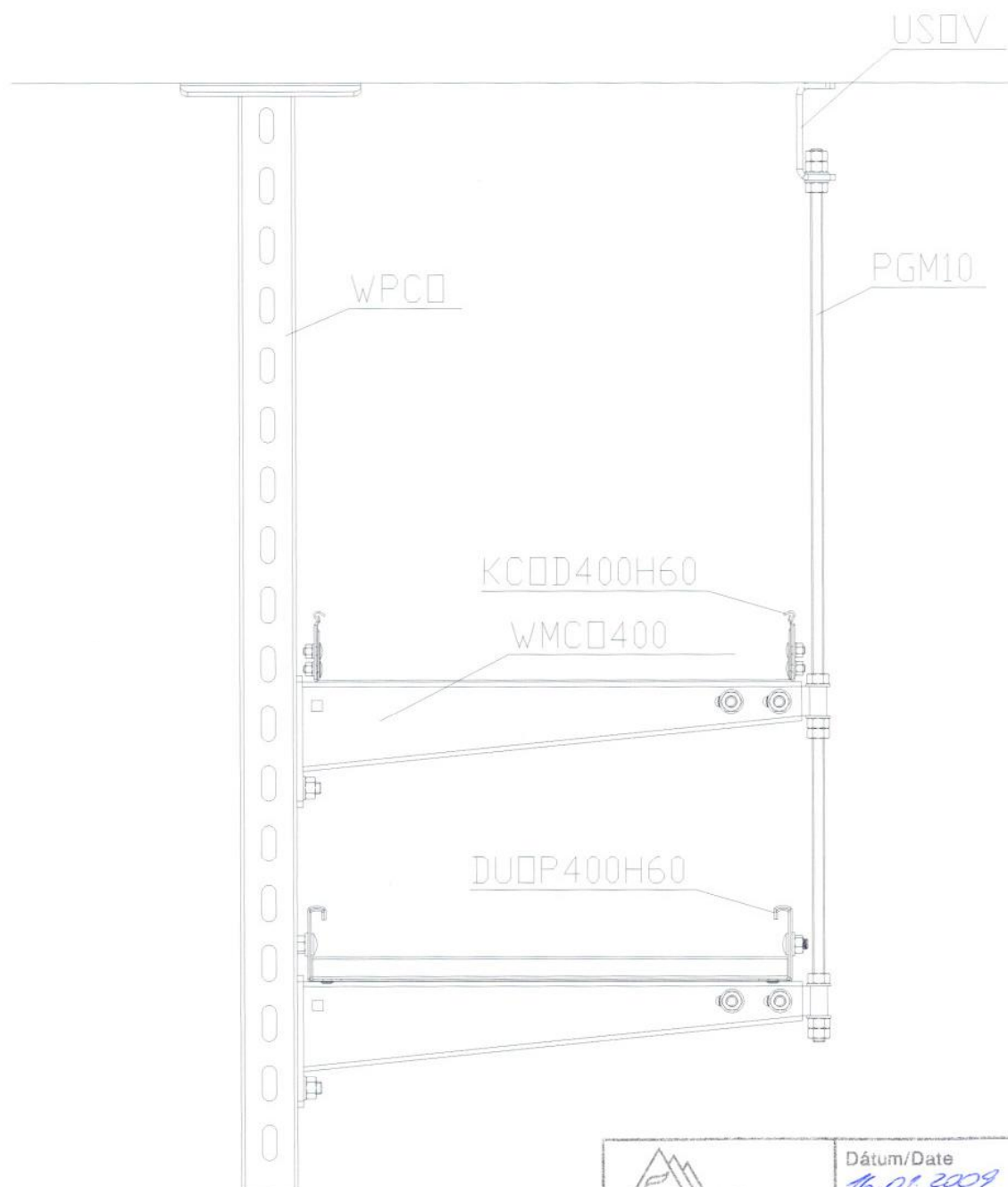
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| <br><b>FIRES s.r.o.</b><br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>                        |
|                                                                                                                                                    | Podpis/Signature<br><i>J. d. S.</i>                    |
|                                                                                                                                                    | Dokument č.<br>Document No. <i>FIRES-FR-004-09-MNE</i> |
|                                                                                                                                                    | Príloha č./Appendix No. <i>36</i>                      |

|                                           |                       |                                                      |                  |
|-------------------------------------------|-----------------------|------------------------------------------------------|------------------|
| Materiál<br>Rodzaj<br>Gatunek<br>Nr normy | <i>Bl. ocynkowana</i> | Nazwa rysunku<br><i>Rysunek konstrukcja drabinka</i> | Podziałka<br>1:1 |
|                                           |                       |                                                      |                  |
|                                           |                       |                                                      |                  |
| Profesjonalne Systemy Tras Kablowych      |                       | BAKS-TECHNOKABEL<br>FIRES 12-16 01 2009rok           |                  |



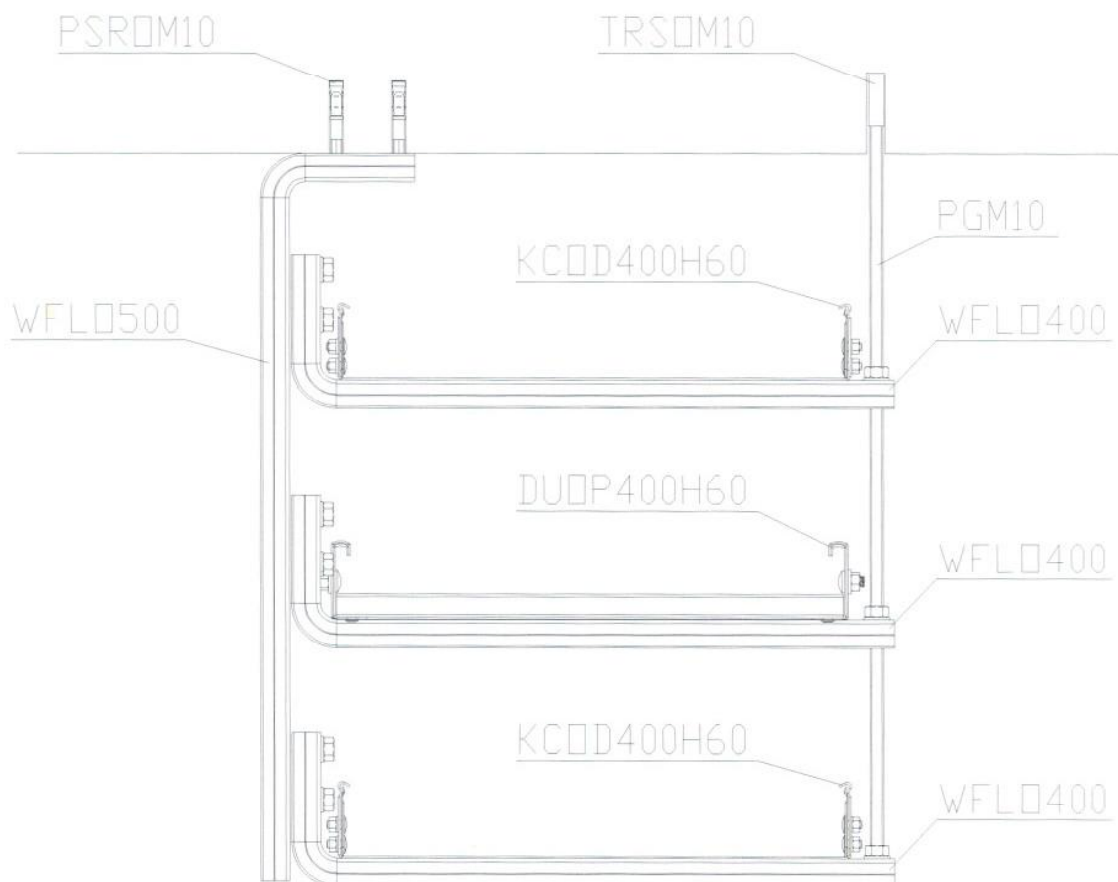
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| <br><b>FIRES S.R.O.</b><br>POŽIARNA ODOLNOST<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009                                                                                  |
|                                                                                                                                                    | Podpis/Signature<br> |
| Dokument č. / Document No. <b>FIRES-FR-004-09-AXE</b>                                                                                              |                                                                                                           |
| Príloha č./Appendix No. <b>3A</b>                                                                                                                  |                                                                                                           |

|                                          |                                           |                                              |                  |
|------------------------------------------|-------------------------------------------|----------------------------------------------|------------------|
| Materiál<br>Podze<br>Gatunek<br>Nr normy | Bl. kwasoodporna<br>1.4401<br>PN-EN 10088 | Nazwa rysunku<br>Rysunek konstrukcja ceownik | Podziałka<br>1:1 |
|                                          | Profesjonalne Systemy Tras Kablowych      | BAKS-TECHNOKABEL<br>FIRES 12-16 01 2009rok   |                  |



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|                                                                                                                                                    | Podpis/Signature<br> |
| Dokument č. / Document No. <b>FIRES-FR-004-01-AWE</b>                                                                                              |                                                                                                           |
| Príloha č./Appendix No. <b>38</b>                                                                                                                  |                                                                                                           |

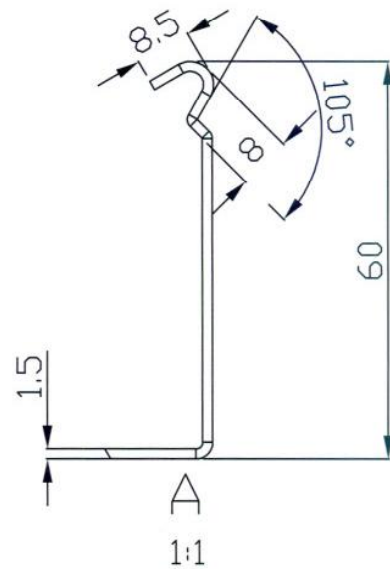
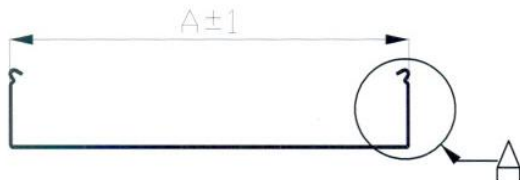
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|--------------------------------------|----------|----------------|--------------------------------------------|--------------------------|-----------|
| Materiál                             | Podzoj   | B1. ocynkována | Názov rysunku                              | Rysunek konstrukcja WPCD | Podzielné |
|                                      | Gatunek  |                |                                            |                          |           |
|                                      | Nr normy |                |                                            |                          | 1:1       |
| Profesjonalne Systemy Tras Kablowych |          |                | BAKS-TECHNOKABEL<br>FIRES 12-16 01 2009rok |                          |           |



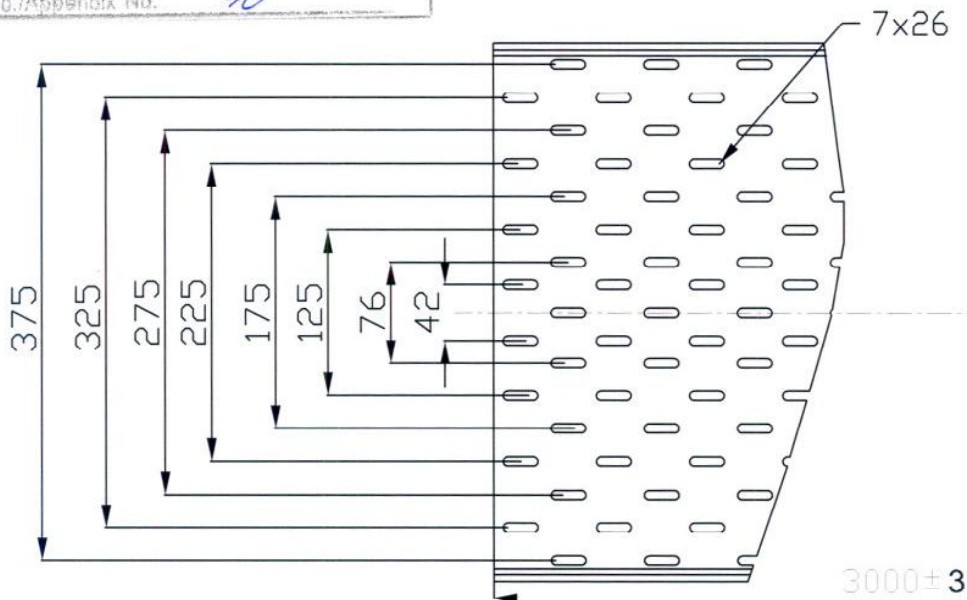
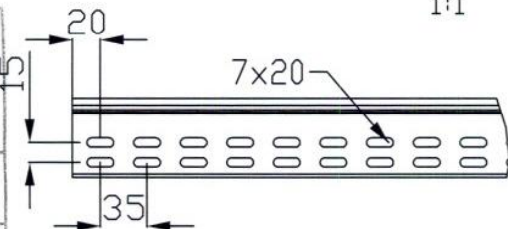
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|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <br><b>FIRES S.r.o.</b><br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br><i>16. 01. 2009</i>                     |
|                                                                                                                                                    | Podpis/Signature<br><i>[Signature]</i>                |
|                                                                                                                                                    | Dokument č. / Document No. <i>FIRES-FR-006-09-ANE</i> |
| Príloha č./Appendix No. <i>39</i>                                                                                                                  |                                                       |

|                                      |           |                       |                                                 |                         |
|--------------------------------------|-----------|-----------------------|-------------------------------------------------|-------------------------|
| Materiál                             | Rodzej    | <i>Bl. ocynkovaná</i> | Názov kresby<br><i>Rysunek konstrukcja WFLD</i> | Podziałka<br><i>1:1</i> |
|                                      | Gatunek   |                       |                                                 |                         |
|                                      | Nr. normy |                       |                                                 |                         |
| Profesjonalne Systemy Tras Kablowych |           |                       | BAKS-TECHNOKABEL<br>FIRES 12-16 01 2009rok      |                         |

| A   | Typ           | Nr.kat |
|-----|---------------|--------|
| 100 | KCDP100H60/3N | 862010 |
| 200 | KCDP200H60/3N | 862020 |
| 300 | KCDP300H60/3N | 862030 |
| 400 | KCDP400H60/3N | 862040 |

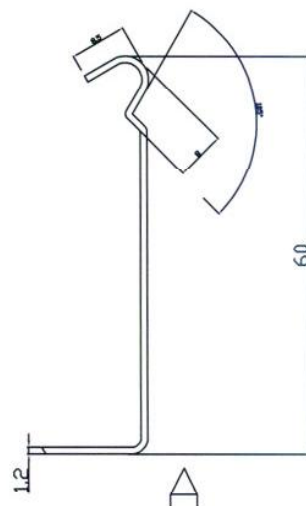
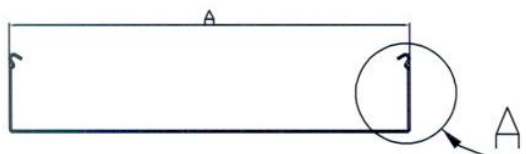


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|-------------------------------------------------------------|--------------------------------------------------------|
| <b>FIRES s.r.o.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2024                               |
|                                                             | Podpis/Signature<br><i>[Signature]</i>                 |
|                                                             | Dokument č.<br>Document No. <i>FIRES-FR-004-09-PWE</i> |
|                                                             | Príloha č./Appendix Nb. <i>40</i>                      |

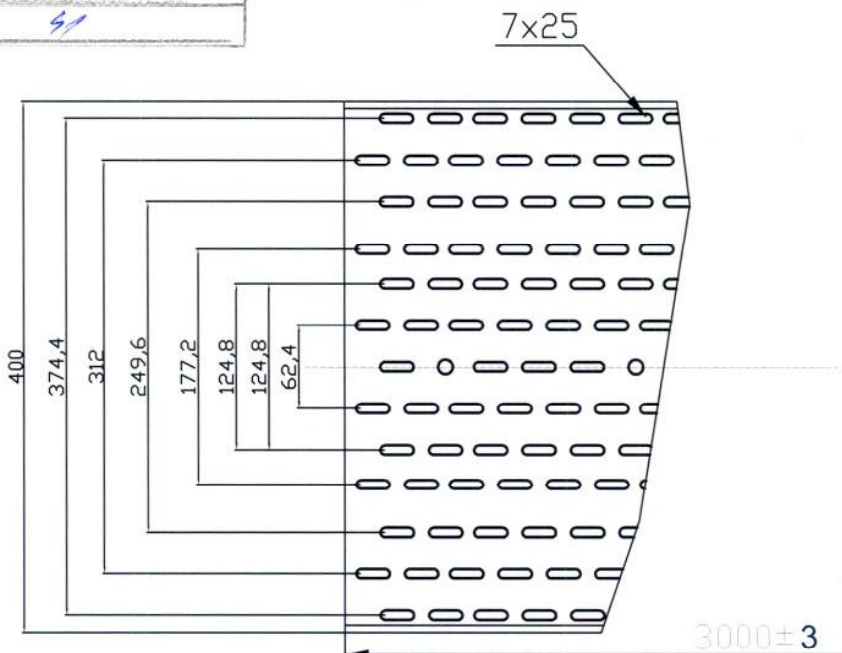
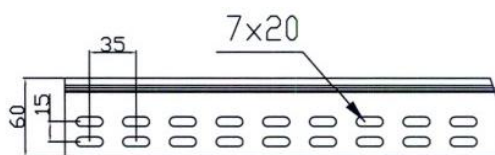


|                                         |                                         |                        |                      |                         |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
|-----------------------------------------|-----------------------------------------|------------------------|----------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------|--|--|--|--|--|--|--|--|
|                                         | Odchyłka<br>wyniarów<br>nietolerowanych | Materiał               | Gatunek              | Masa [kg]               | Podziałka                                                                                                                                  | Format A4               |        |  |  |  |  |  |  |  |  |
|                                         |                                         |                        | Nr normy             |                         |                                                                                                                                            | PN-EN 10142 + A1 : 1997 | Arkusz |  |  |  |  |  |  |  |  |
|                                         |                                         | półfabrykat (nr normy) |                      |                         |                                                                                                                                            | Arkuszy                 |        |  |  |  |  |  |  |  |  |
| Projektował                             | J.GROCHOWSKI                            | Data                   | 20.10.05             | Nazwa rysunku           |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
| Rysował                                 | J.Grochowski                            |                        | 20.10.05             | KCDP400H60/3N           |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
| Sprawdził                               | T.WŁODARCZYK                            |                        | 20.10.05             |                         |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
| Zatwierdził                             | JKLICZEK                                |                        | 20.10.05             | Nr programu maszynowego |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
| Profesjonalne Systemy<br>Tras Kablowych |                                         |                        | Nr rysunku<br>862040 |                         | Nr zmiany                                                                                                                                  |                         |        |  |  |  |  |  |  |  |  |
|                                         |                                         |                        |                      |                         | <table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> |                         |        |  |  |  |  |  |  |  |  |
|                                         |                                         |                        |                      |                         |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
|                                         |                                         |                        |                      |                         |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |
|                                         |                                         |                        |                      |                         |                                                                                                                                            |                         |        |  |  |  |  |  |  |  |  |

| A   | Typ           | Nr.kat |
|-----|---------------|--------|
| 100 | KCDD100H60/3N |        |
| 200 | KCDD200H60/3N |        |
| 300 | KCDD300H60/3N |        |
| 400 | KCDD400H60/3N |        |

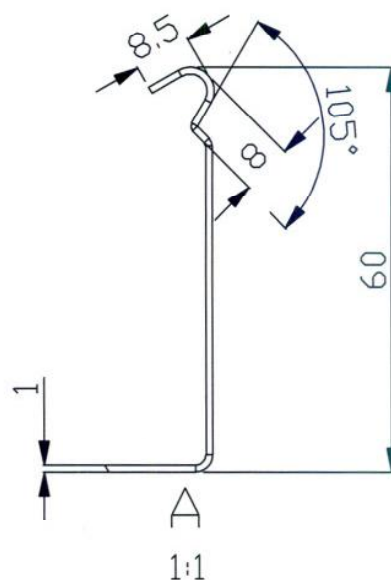
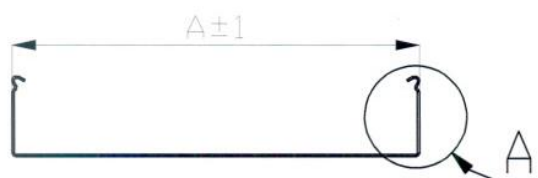


|                                                                                                                                                  |                                                                                                       |
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| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Datum/Date<br>16.01.2009                                                                              |
|                                                                                                                                                  | Podpis/Signature<br> |
| Dokument č.<br>Document No. <i>FIRES-FR-006-09 ANE</i>                                                                                           |                                                                                                       |
| Příloha č./Appendix Nb. <i>51</i>                                                                                                                |                                                                                                       |

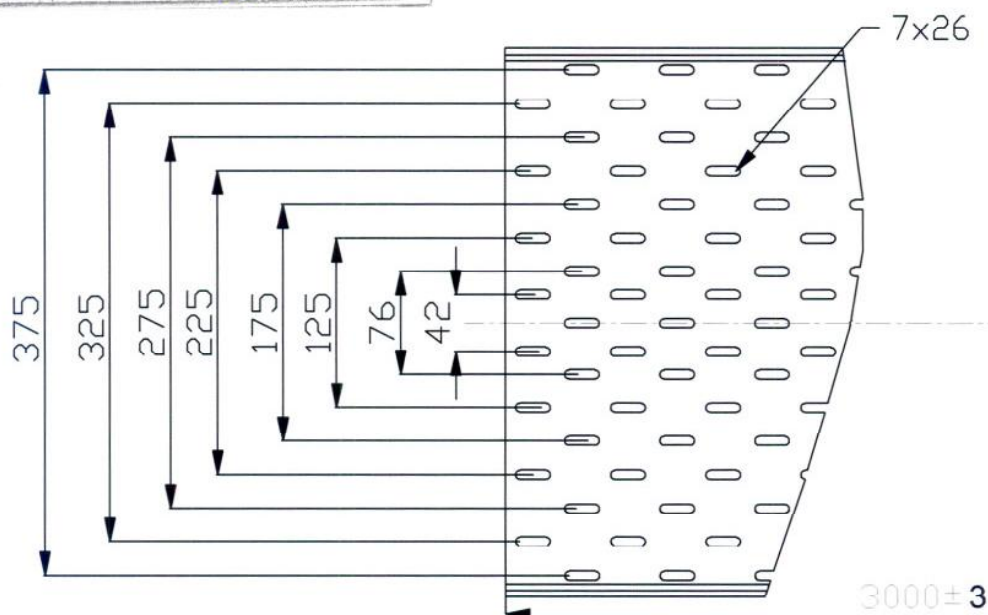
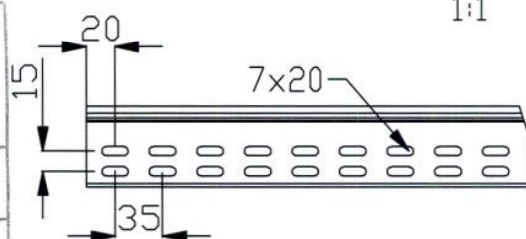


|                                                                                     |                                         |                                                                                               |                        |                                |
|-------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------|------------------------|--------------------------------|
|  | Dachytka<br>wymiarów<br>nietolerowanych | Materiał<br>Gatunek<br>Nr normy<br>półfabrykat (nr normy)                                     | Masa (kg)<br>Podziałka | Format<br>Arkusz<br>Arkuszy    |
|                                                                                     |                                         |                                                                                               |                        |                                |
| Projektował<br>J.GROCHOWSKI                                                         | Nazwisko<br>J.Grochowski                | Podpis<br> | Data<br>20.10.08       | Nazwa rysunku<br>KCDD400H60/3N |
| Rysował<br>T.WŁODARCZYK                                                             | Nazwisko<br>T.Włodarczyk                | Podpis<br> | Data<br>20.10.08       | Nr programu maszynowego        |
| Sprawdził<br>J.KLICZEK                                                              | Nazwisko<br>J.Kliczek                   | Podpis<br> | Data<br>20.10.08       | Nr rysunku                     |
| Profesjonalne Systemy<br>Tras Kablowych                                             |                                         |                                                                                               |                        | Nr zmiany                      |

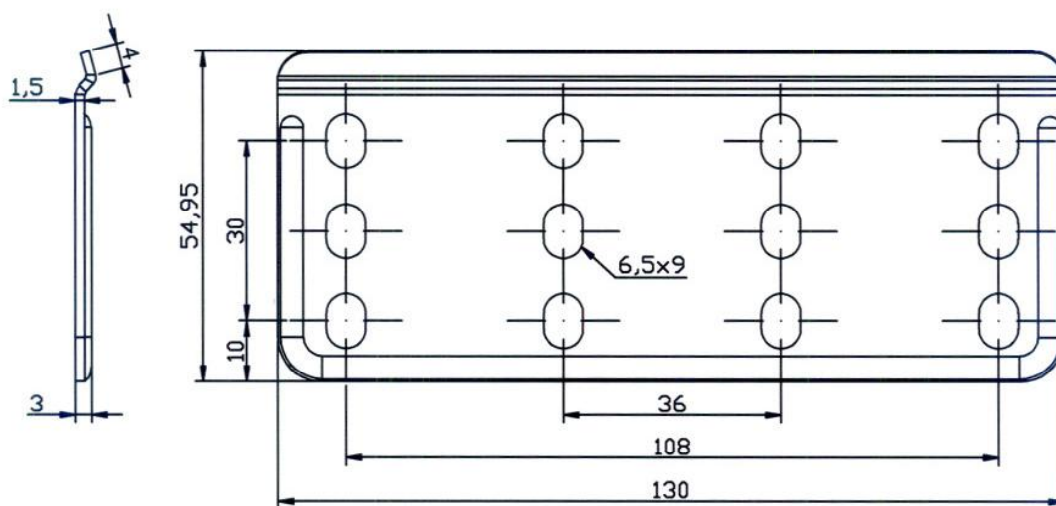
| A   | Typ             | Nr.kat |
|-----|-----------------|--------|
| 100 | KCQJ100H60/3N-E |        |
| 200 | KCQJ200H60/3N-E |        |
| 300 | KCQJ300H60/3N-E |        |
| 400 | KCQJ400H60/3N-E |        |



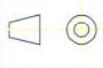
|                                                                                                                                                  |                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009                               |
|                                                                                                                                                  | Podpis/Signature<br><i>[Signature]</i>                 |
|                                                                                                                                                  | Dokument č.<br>Document No. <i>FIRES-FR-009-09-AWE</i> |
|                                                                                                                                                  | Příloha č./Appendix No. <i>42</i>                      |

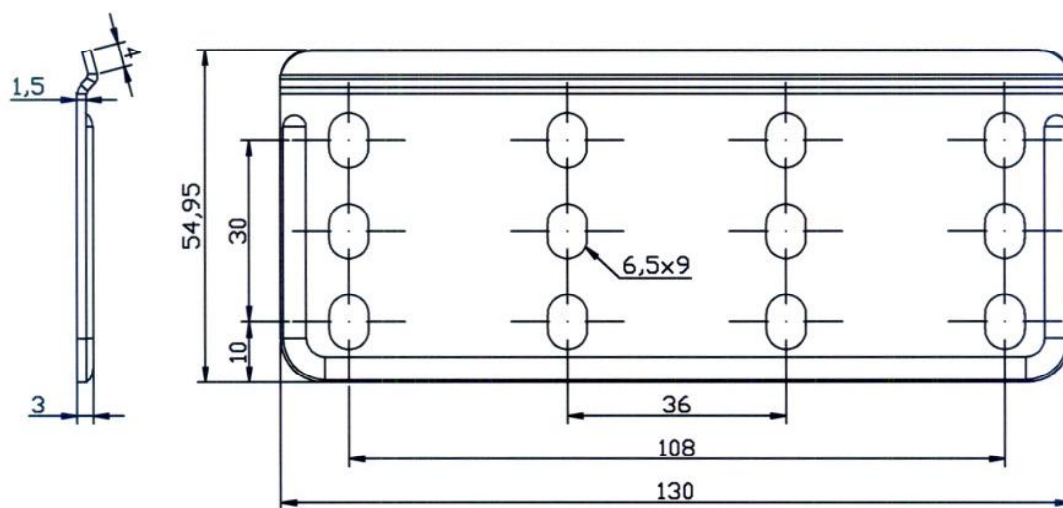


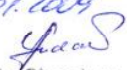
|                                                                                                                             |                                    |          |                         |                 |           |           |           |           |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------|-------------------------|-----------------|-----------|-----------|-----------|-----------|
|                                          | Długość<br>wymiarów<br>niezgodnych | Materiał | Gatunek                 | gat. 1.4...     | Masa [kg] | Podziałka | Format A4 |           |
|                                                                                                                             |                                    |          | Nr normy                | EN 10088        |           |           | Arkusz    |           |
| Projektował                                                                                                                 | J.GROCHOWSKI                       | Data     | Nazwa rysunku           |                 |           |           |           |           |
| Rysował                                                                                                                     | J.Grochowski                       |          | 20.10.05                | KCQJ400H60/3N-E |           |           |           |           |
| Sprawdził                                                                                                                   | T.WŁODARCZYK                       |          | 20.10.05                |                 |           |           |           |           |
| Zatwierdził                                                                                                                 | J.KLICZEK                          |          | 20.10.05                |                 |           |           |           |           |
|                                                                                                                             |                                    |          | Nr programu maszynowego |                 |           |           |           | Nr zmiany |
|  Profesjonalne Systemy<br>Tras Kablowych |                                    |          | Nr rysunku              |                 |           |           |           |           |

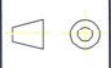


|                                                                                                                                                     |                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <br><b>FIRES</b> s.r.o.<br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>          |
|                                                                                                                                                     | Podpis/Signature<br><i>J. Grochowski</i> |
| Dokument č. / Document No. <i>FIRES-FR-004-09-DWE</i>                                                                                               |                                          |
| Príloha č./Appendix No. <i>43</i>                                                                                                                   |                                          |

|                                                                                     |                                        |                                                                                                  |                   |                  |           |
|-------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------|-------------------|------------------|-----------|
|  | Odchytka<br>vynálezu<br>netolerovaných | Materiál<br>Blacha stal.cynknet.Sedzinira<br>Nr normy PN-EN 10327/2005<br>podfabrykat (nr normy) | Masa (kg)<br>0,09 | Podzielka<br>1:1 | Format A4 |
|                                                                                     |                                        |                                                                                                  |                   |                  |           |
| Projektant<br><i>J.GROCHOWSKI</i>                                                   | Nazwa rysunku<br><i>LPH60N</i>         |                                                                                                  |                   |                  |           |
| Rysował<br><i>J.Grochowski</i>                                                      |                                        |                                                                                                  |                   |                  |           |
| Sprawił<br><i>T.WŁODARCZYK</i>                                                      |                                        |                                                                                                  |                   |                  |           |
| Zatwierdził<br><i>J.KLICZEK</i>                                                     |                                        |                                                                                                  |                   |                  |           |
| Profesjonalne Systemy<br>Tras Kablowych                                             |                                        | Nr rysunku<br><i>860700</i>                                                                      | Nr zmiany         |                  |           |



|                                                                                                                                                    |                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <br><b>FIRES</b> s.r.o.<br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Datum/Date<br>16.01.2009                                                                                  |
|                                                                                                                                                    | Podpis/Signature<br> |
| Dokument č. / Document No. <b>FIRES-FR-009-09-AWE</b>                                                                                              |                                                                                                           |
| Příloha č. / Appendix No. <b>44</b>                                                                                                                |                                                                                                           |

|                                                                                     |                                          |          |                                               |                               |                      |                  |
|-------------------------------------------------------------------------------------|------------------------------------------|----------|-----------------------------------------------|-------------------------------|----------------------|------------------|
|  | Odchyłka<br>wymiarów<br>nie tolerowanych | Materiał | Gatunek <b>Blacha stalocynk.net.Sędzinira</b> | Masa [kg] <b>0,09</b>         | Podziałka <b>1:1</b> | Format <b>A4</b> |
|                                                                                     |                                          |          | Nr normy <b>PN-EN 10327:2005</b>              | półfabrykat (nr normy)        | Artykuł              | Artykuł          |
| Projektował <b>J.GROCHOWSKI</b>                                                     | Nazwa                                    | Podpis   | Data <b>20.10.05</b>                          | Nazwa rysunku <b>LPOPH60E</b> |                      |                  |
| Rysował <b>J.Grochowski</b>                                                         |                                          |          | Data <b>20.10.05</b>                          |                               |                      |                  |
| Sprawdził <b>T.WŁODARCZYK</b>                                                       |                                          |          | Data <b>20.10.05</b>                          |                               |                      |                  |
| Zatwierdził <b>J.KLICZEK</b>                                                        |                                          |          | Data <b>20.10.05</b>                          |                               |                      |                  |
| Profesjonalne Systemy<br>Tras Kablowych                                             |                                          |          | Nr rysunku <b>861200</b>                      | Nr zmiany                     |                      |                  |
|  |                                          |          |                                               |                               |                      |                  |

Technical drawing of a rectangular plate with dimensions and a table.

Dimensions:

- Overall width: 64
- Overall height: 390
- Top flange width: 6
- Top flange height: 1
- Top flange radius: R20,5
- Top flange thickness: 23
- Plate thickness: 14
- Plate width: 33
- Plate height: 41
- Plate width: 24
- Plate height: 24
- Plate width: 41
- Plate height: 41

| Document No. | Document No. | Document No. |
|--------------|--------------|--------------|
| 95           | 95           | 95           |

|                                                                                       |                                         |              |        |  |            |                        |        |                               |                   |           |           |           |  |
|---------------------------------------------------------------------------------------|-----------------------------------------|--------------|--------|--|------------|------------------------|--------|-------------------------------|-------------------|-----------|-----------|-----------|--|
|  | Długość<br>wymiarów<br>nie tolerowanych | Nazwisko     | Podpis |  | Materiał   | Gatunek                |        | Blacha stal.cynk.net.Sędzimir |                   | Masa [kg] | Podziałka | Format    |  |
|                                                                                       |                                         |              |        |  |            | Nr normy               |        | PN-EN 10327:2005              |                   |           |           | Ar-kusz   |  |
| Projektował                                                                           |                                         | J.GRUCHOWSKI |        |  |            | półfabrykat (nr normy) |        |                               |                   |           |           | Ar-kuszy  |  |
| Rysował                                                                               |                                         | J.Grachowski |        |  |            | 20.10.05               |        | Nazwa rysunku                 |                   |           |           |           |  |
| Sprawdził                                                                             |                                         | T.WŁODARCZYK |        |  |            | 20.10.05               |        |                               |                   |           |           |           |  |
| Zatwierdził                                                                           |                                         | J.KLICZEK    |        |  |            | 20.10.05               |        | Blacha łącznikowa             |                   |           |           | Nr zmiany |  |
| Profesjonalne Systemy<br>Tras Kablowych                                               |                                         |              |        |  | Nr rysunku |                        | 862440 |                               | Blacha łącznikowa |           | Nr zmiany |           |  |

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 Priloha č./Appendix N<sup>o</sup>. **96**

64  
 6  
 20.5  
 23  
 14  
 33  
 41  
 24  
 24  
 24  
 41  
 390

|                                                                                       |                                             |        |          |                        |               |                     |                   |           |           |           |
|---------------------------------------------------------------------------------------|---------------------------------------------|--------|----------|------------------------|---------------|---------------------|-------------------|-----------|-----------|-----------|
|  | Długośćka<br>wyników<br>nie<br>tolerowanych |        | Materiał | Gatunek                |               | Blacha kwasoodporna |                   | Masa [kg] | Podziałka | Format A3 |
|                                                                                       |                                             |        |          | Nr normy               |               | 0H18N9              |                   |           |           |           |
|                                                                                       |                                             |        |          | półfabrykat (nr normy) |               |                     |                   | 0,24      | 1:1       | Arkusz    |
|                                                                                       |                                             |        |          |                        |               |                     |                   |           |           |           |
| Projektował                                                                           | J.GROCHOWSKI                                | Podpis | Data     |                        | Nazwa rysunku |                     | Blacha łącznikowa |           | Nr zmiany |           |
| Rysował                                                                               | J.Grochowski                                |        | 20.10.05 |                        | 20.10.05      |                     | 20.10.05          |           |           |           |
| Sprawdził                                                                             | T.WŁODARCZYK                                |        | 20.10.05 |                        | 20.10.05      |                     | 20.10.05          |           |           |           |
| Zatwierdził                                                                           | J.KLICZEK                                   |        |          |                        |               |                     |                   |           |           |           |
| Profesjonalne Systemy<br>Tras Kablowych                                               |                                             |        |          |                        |               |                     |                   |           |           |           |
|  |                                             |        |          |                        |               |                     |                   |           |           |           |
| 861140                                                                                |                                             |        |          |                        |               |                     |                   |           |           |           |

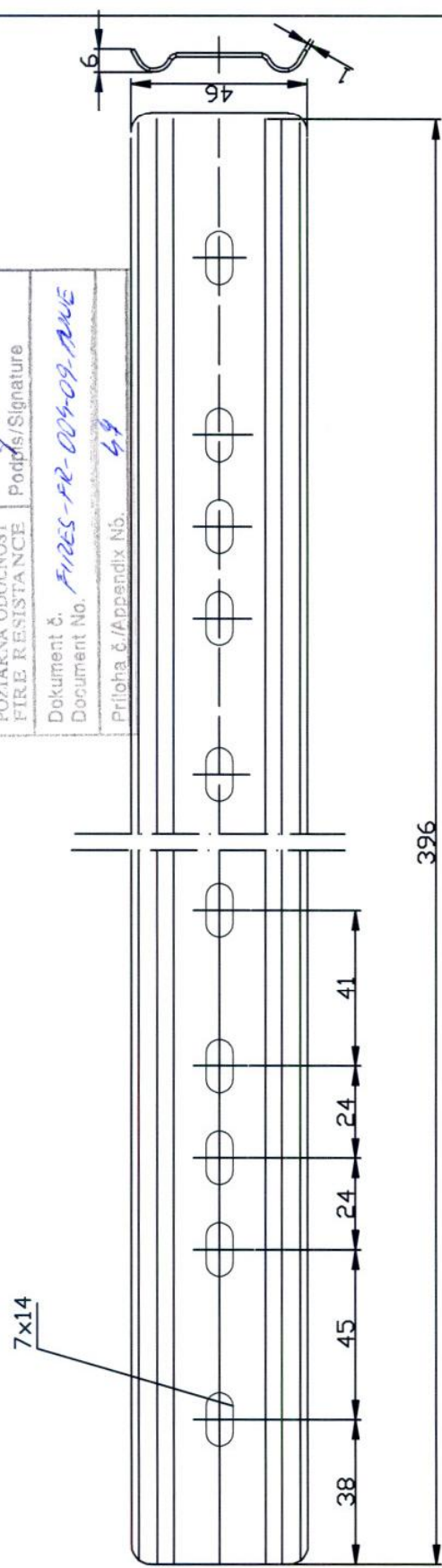
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*16.01.2009*

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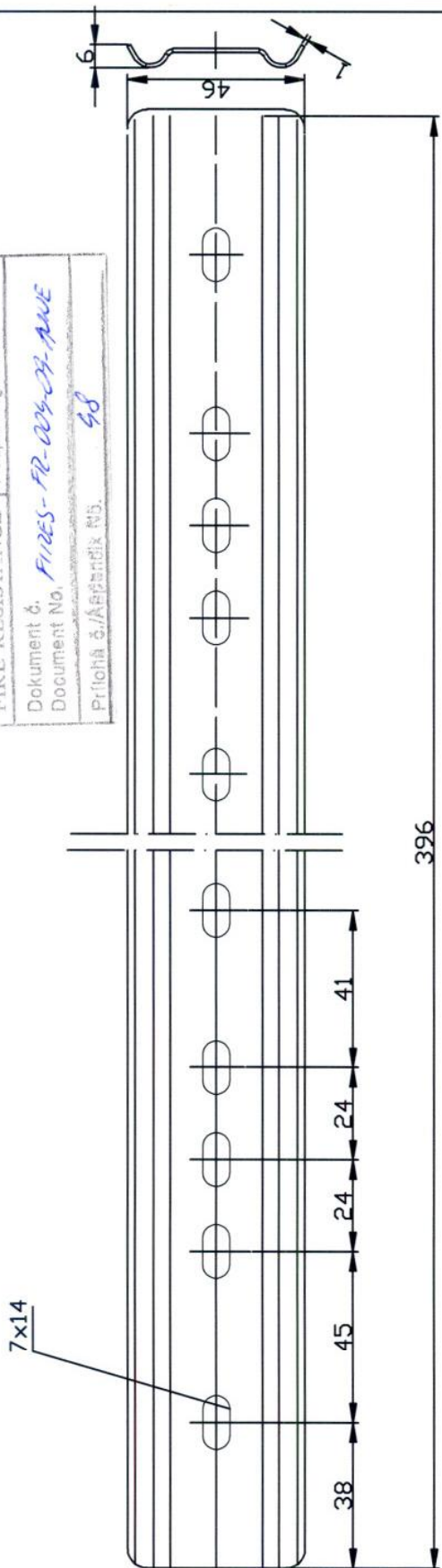
Dokument č. *FIRES-FR-004-09-AME*  
Document No.

Priloha č./Appendix No. *49*

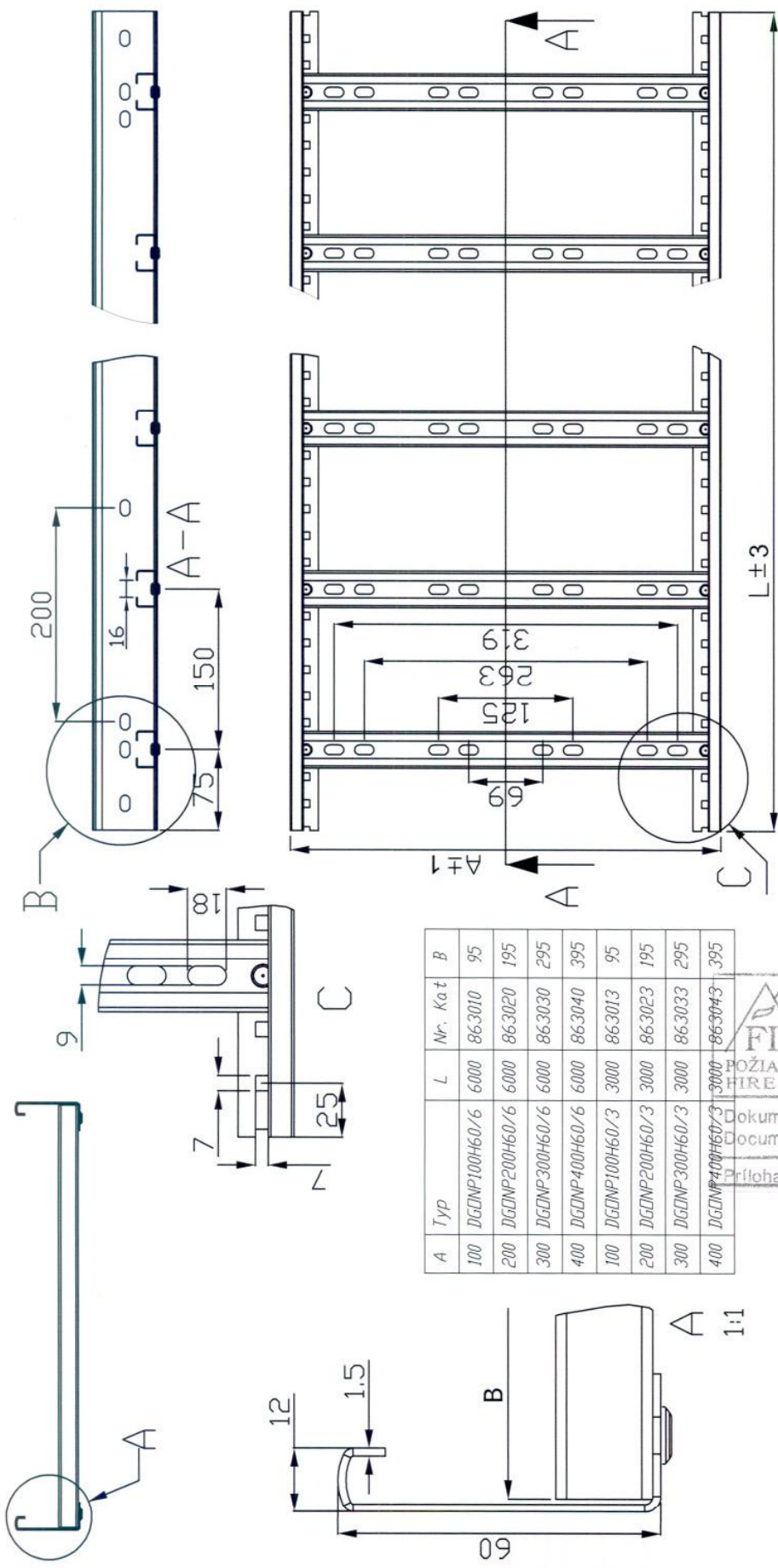


|                                                    |                                                                      |                                               |                                                   |                      |                  |                               |           |
|----------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------|----------------------|------------------|-------------------------------|-----------|
|                                                    | Długość<br>wymiarów<br>nieolerowanych                                | Gatunek<br>Nr normy<br>półfabrykat (nr normy) | Blacha stal.cynk.met.Sędzimir<br>PN-EN 10327:2005 | Masa [kg]<br>0,16    | Podziałka<br>1:1 | Format A3<br>Arkusz<br>Arkusz |           |
|                                                    |                                                                      |                                               |                                                   |                      |                  |                               |           |
| Projektował<br>Rysował<br>Sprawdził<br>Zatwierdził | Nazwisko<br>J.GROCHOWSKI<br>J.Grochowski<br>T.WŁODARCZYK<br>JKLICZEK | Data<br>20.10.05<br>20.10.05<br>20.10.05      | Nazwa rysunku<br>BZKD400N                         | Blacha zakończeniowa |                  |                               | Nr zmiany |
| Profesjonalne Systemy<br>Tras Kablowych            |                                                                      |                                               | Nr rysunku<br>862540                              |                      |                  |                               |           |

|                                                                                                                                               |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
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|                                                                                                                                               | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. <i>FIRES-FR-004-09-ANE</i><br>Document No.                                                                                        |                                        |
| Príloha č./Appendix N <sup>o</sup> . <i>48</i>                                                                                                |                                        |



|                                                                                       |                                       |                                               |                               |                   |                  |                               |
|---------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------|-------------------------------|-------------------|------------------|-------------------------------|
|  | Długość<br>wymiarów<br>nieolerowanych | Gatunek<br>Nr normy<br>półfabrykat (nr normy) | Blacha kwasoodporna<br>0H18N9 | Masa [kg]<br>0,16 | Podziałka<br>1:1 | Format A3<br>Arkusz<br>Arkusz |
|                                                                                       |                                       |                                               |                               |                   |                  |                               |
| Projektował                                                                           | J.GROCHOWSKI                          | Nazwa rysunku<br><b>BZK□400E</b>              |                               |                   |                  |                               |
| Rysował                                                                               | J.Grochowski                          | Blacha zakończeniowa                          |                               |                   |                  |                               |
| Sprawdził                                                                             | T.WŁODARCZYK                          | Nr rysunku<br><b>862640</b>                   |                               |                   |                  |                               |
| Zatwierdził                                                                           | J.KLICZEK                             | Nr zmiany                                     |                               |                   |                  |                               |
| Profesjonalne Systemy<br>Tras Kablowych                                               |                                       |                                               |                               |                   |                  |                               |



| A   | Typ           | L    | Nr. Kat | B   |
|-----|---------------|------|---------|-----|
| 100 | DGONP100H60/6 | 6000 | 863010  | 95  |
| 200 | DGONP200H60/6 | 6000 | 863020  | 195 |
| 300 | DGONP300H60/6 | 6000 | 863030  | 295 |
| 400 | DGONP400H60/6 | 6000 | 863040  | 395 |
| 100 | DGONP100H60/3 | 3000 | 863013  | 95  |
| 200 | DGONP200H60/3 | 3000 | 863023  | 195 |
| 300 | DGONP300H60/3 | 3000 | 863033  | 295 |
| 400 | DGONP400H60/3 | 3000 | 863043  | 395 |

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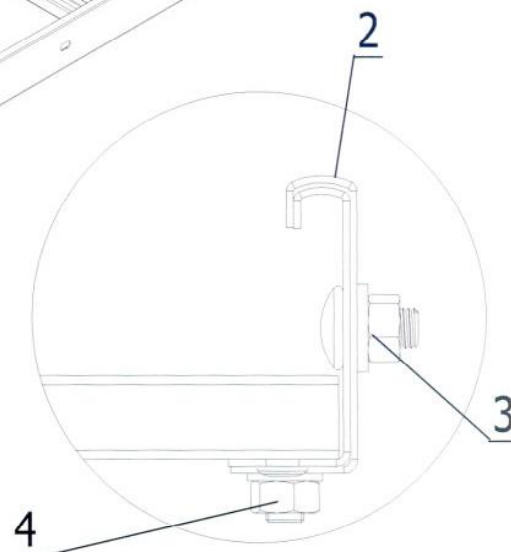
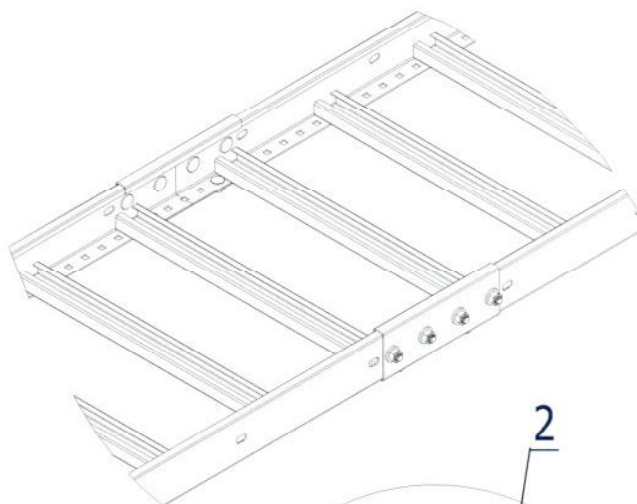
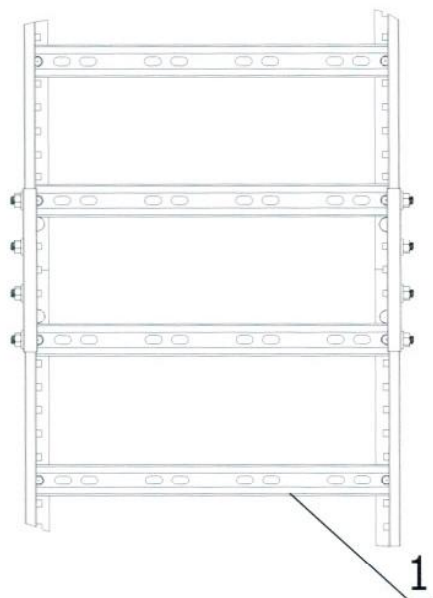
Dokument č. **FIRES-FR-004-09-MKE**  
Document No.

Príloha č./Appendix No. **99**

Dátum/Date **16.01.2009**  
Podpis/Signature *[Signature]*

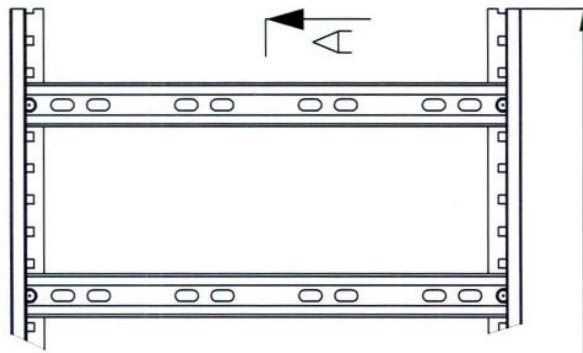
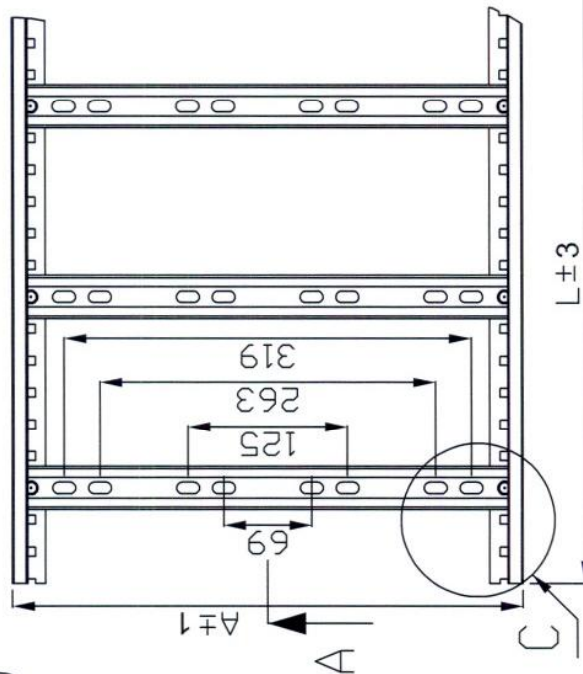
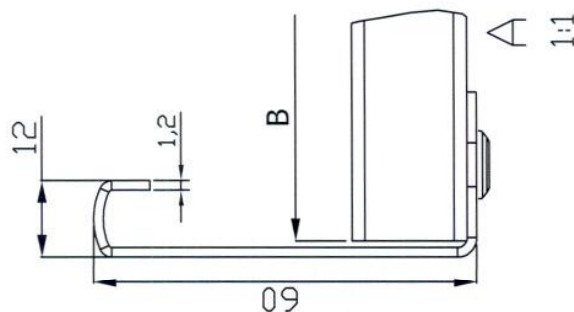
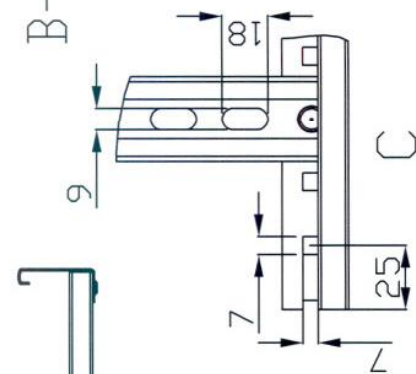
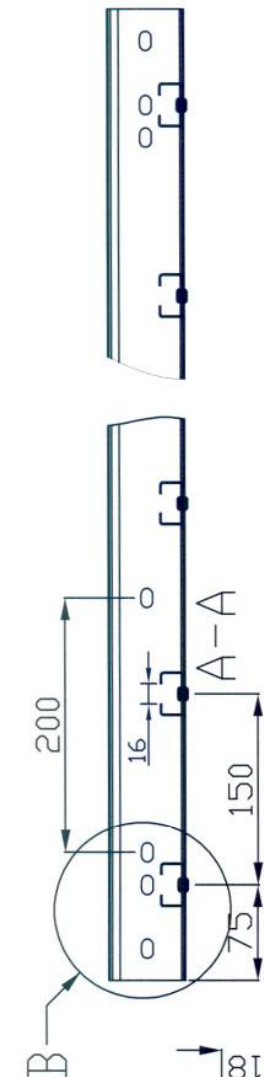
|                                         |                                               |               |           |              |
|-----------------------------------------|-----------------------------------------------|---------------|-----------|--------------|
| Dachyčka<br>výkrova<br>nie tolerovaných | Gutunek<br>Nr normy<br>półfabrykat (nr normy) | Masa (kg)     | Podziałka | Format<br>A4 |
|                                         |                                               |               |           |              |
| Projektował<br>J.GROCHOWSKI             | Nazwa rysunku<br>20.10.05                     | DGONP400H60/3 |           |              |
| Wysował<br>J.Grochowski                 | Data<br>20.10.05                              |               |           |              |
| Sprawił<br>T.WIDMARCZYK                 | Podpis                                        |               |           |              |
| Zatwierdził<br>J.MICZEK                 | Nr<br>20.10.05                                |               |           |              |
| Nazwa programu<br>Naszywanego           |                                               | Nr zblony     |           |              |

**BAKSES** Instalacje Systemy Tras Kablowych



|                                                                                                                                                     |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <br><b>FIRES s.r.o.</b><br>POZIARNA ODOLNOST'<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009               |
|                                                                                                                                                     | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. / Document No. <i>FIRES-PR-004-09-AWE</i>                                                                                               |                                        |
| Příloha č./Appendix No. <i>50</i>                                                                                                                   |                                        |

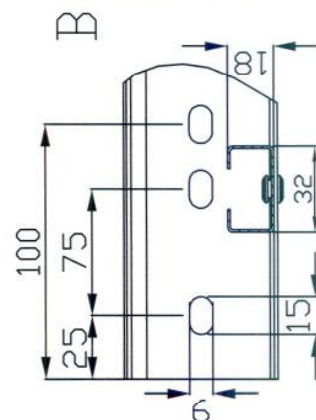
|                                         |                                          |              |                         |           |              |                                    |                  |                                          |           |  |
|-----------------------------------------|------------------------------------------|--------------|-------------------------|-----------|--------------|------------------------------------|------------------|------------------------------------------|-----------|--|
| 4                                       | śruba                                    | SGN M6x12    |                         | 4         | 650442       |                                    |                  |                                          |           |  |
| 3                                       | śruba                                    | SGN M8x14    |                         | 8         | 650142       |                                    |                  |                                          |           |  |
| 2                                       | łącznik                                  | LDDNCH60     |                         | 2         | 863000       |                                    |                  |                                          |           |  |
| 1                                       | DRABINKA                                 | DGONP400H60  |                         | 1         | 863043       |                                    |                  |                                          |           |  |
| Pos.                                    | Benennung                                | Zeichnung-Nr | Material                | Stck.     | Katalogs Nr. |                                    |                  |                                          |           |  |
|                                         | Dochyłka<br>wyniarów<br>nie tolerowanych | Material     | Gatunek                 | Masa (kg) | Podziałka    | Format A4<br>Arkusz 1<br>Arkuszy 1 |                  |                                          |           |  |
|                                         |                                          |              | Nr normy                |           |              |                                    | PN-EN 10327:2005 |                                          |           |  |
|                                         |                                          |              | polifabrykat (nr normy) |           |              |                                    |                  |                                          |           |  |
| Projektował                             |                                          | Nazwisko     | J.Grochowski            | Podpis    | Data         | 21-Nov-06                          | Nazwa rysunku    | Nr programu<br>maszynowego<br>Nr rysunku | Nr zmiany |  |
| Rysował                                 |                                          |              |                         |           |              |                                    |                  |                                          |           |  |
| Sprawdził                               |                                          |              |                         |           |              |                                    |                  |                                          |           |  |
| Zatwierdził                             |                                          |              |                         |           |              |                                    |                  |                                          |           |  |
| Profesjonalne Systemy<br>Tras Kablowych |                                          |              |                         |           |              |                                    |                  |                                          |           |  |



| A   | Typ           | L    | Nr. Kat | B   |
|-----|---------------|------|---------|-----|
| 100 | DGDD100H60/6N | 6000 |         | 95  |
| 200 | DGDD200H60/6N | 6000 |         | 195 |
| 300 | DGDD300H60/6N | 6000 |         | 295 |
| 400 | DGDD400H60/6N | 6000 |         | 395 |
| 100 | DGDD100H60/3N | 3000 |         | 95  |
| 200 | DGDD200H60/3N | 3000 |         | 195 |
| 300 | DGDD300H60/3N | 3000 |         | 295 |
| 400 | DGDD400H60/3N | 3000 |         | 395 |

**FIRES S.R.O.**  
POZIARNA ODOLNOŚĆ  
FIRE RESISTANCE

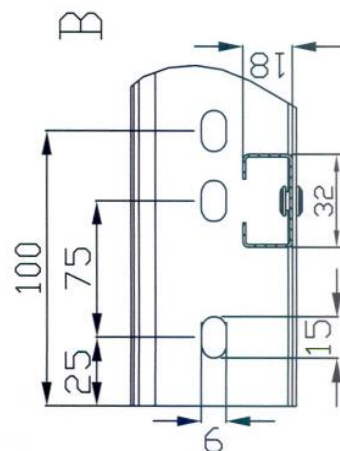
Dokument č. / Document No. **FIRES-FR-004-09-AWE**  
Příloha č./Appendix No. **57**



|                                                   |                                               |               |           |                         |
|---------------------------------------------------|-----------------------------------------------|---------------|-----------|-------------------------|
| Dřívky<br>výrobce<br>ne tolerovaných              | Gatunek<br>Nr normy<br>półfabrykat (nr normy) | Masa kg       | Podziałka | ornat<br>Afusz<br>Afusz |
|                                                   |                                               |               |           |                         |
| Projektant<br>Rysował<br>Sprawdził<br>Zatwierdził | Nazwa rysunku                                 | Data          | Podpis    | Nr zmiany               |
|                                                   |                                               |               |           |                         |
| J.GROCHOWSKI                                      |                                               | 20.10.05      |           |                         |
| J.Grochowski                                      |                                               | 20.10.05      |           |                         |
| T.WLODARCZYK                                      |                                               | 20.10.05      |           |                         |
| JKLICZEK                                          |                                               | 20.10.05      |           |                         |
| Nazwa rysunku                                     |                                               | DGDD400H60/3N |           |                         |
| Data                                              |                                               | 20.10.05      |           |                         |
| Podpis                                            |                                               | ---           |           |                         |
| Zatwierdził                                       |                                               | ---           |           |                         |
| Nazwa rysunku                                     |                                               | ---           |           |                         |
| Data                                              |                                               | ---           |           |                         |
| Podpis                                            |                                               | ---           |           |                         |
| Zatwierdził                                       |                                               | ---           |           |                         |



Profesjonalne Systemy Tras Kablowych



| A   | Typ           | L    | Nr. Kot | B   |
|-----|---------------|------|---------|-----|
| 100 | DUPP100H60/3N | 6000 |         | 95  |
| 200 | DUPP200H60/3N | 6000 |         | 195 |
| 300 | DUPP300H60/3N | 6000 |         | 295 |
| 400 | DUPP400H60/3N | 6000 |         | 395 |
| 100 | DUPP100H60/3N | 3000 |         | 95  |
| 200 | DUPP200H60/3N | 3000 |         | 195 |
| 300 | DUPP300H60/3N | 3000 |         | 295 |
| 400 | DUPP400H60/3N | 3000 |         | 395 |



Dokument č. *F1125*  
Document No.

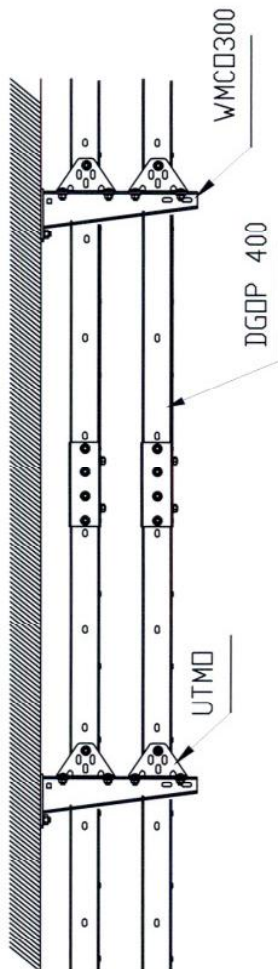
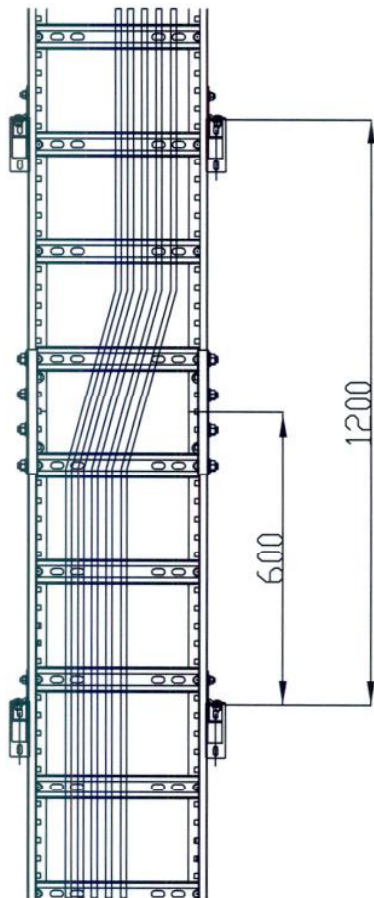
Priloha 6./Appendix No.

Dátum/Date  
16.01.2009  
Podpis/Signature

|                                                                                       |                                            |                 |                        |           |                         |                             |  |
|---------------------------------------------------------------------------------------|--------------------------------------------|-----------------|------------------------|-----------|-------------------------|-----------------------------|--|
|  | Długość<br>wytłoczenia<br>nie tolerowanych | Materiał        | Gatunek                | Masa (kg) | Podziałka               | Format<br>Arkusz<br>Arkuszy |  |
|                                                                                       |                                            |                 | Nr normy               |           |                         |                             |  |
|                                                                                       |                                            |                 | podfabrykat (nr normy) |           |                         |                             |  |
|                                                                                       |                                            |                 | Nazwa rysunku          |           |                         |                             |  |
|                                                                                       |                                            |                 | DUP 400H60/3N          |           |                         |                             |  |
| Nazwa                                                                                 | Podpis                                     | Data            | 20.10.05               | Nr        | programu<br>Maszynowego | Nr zmiany                   |  |
|                                                                                       |                                            |                 | 20.10.05               |           |                         |                             |  |
|                                                                                       |                                            |                 | 20.10.05               |           |                         |                             |  |
|                                                                                       |                                            |                 | 20.10.05               |           |                         |                             |  |
| JKLICZEK                                                                              |                                            | Trans Kablowych |                        |           |                         |                             |  |
| JKLICZEK                                                                              |                                            | Systemy         |                        |           |                         |                             |  |
| JKLICZEK                                                                              |                                            | BANK            |                        |           |                         |                             |  |

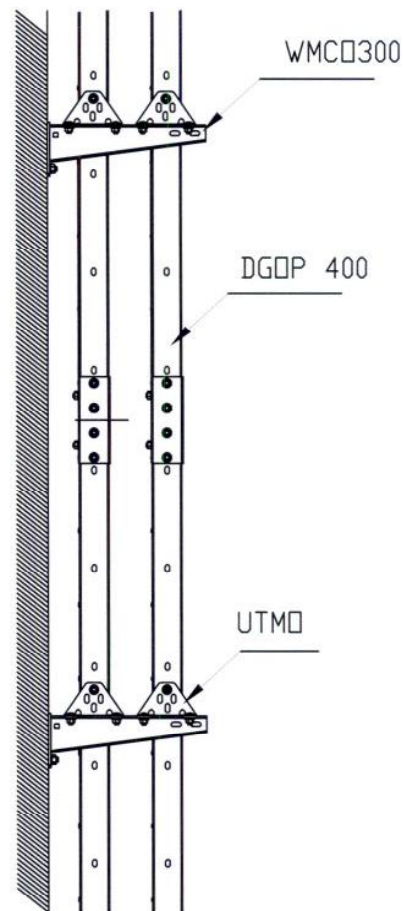
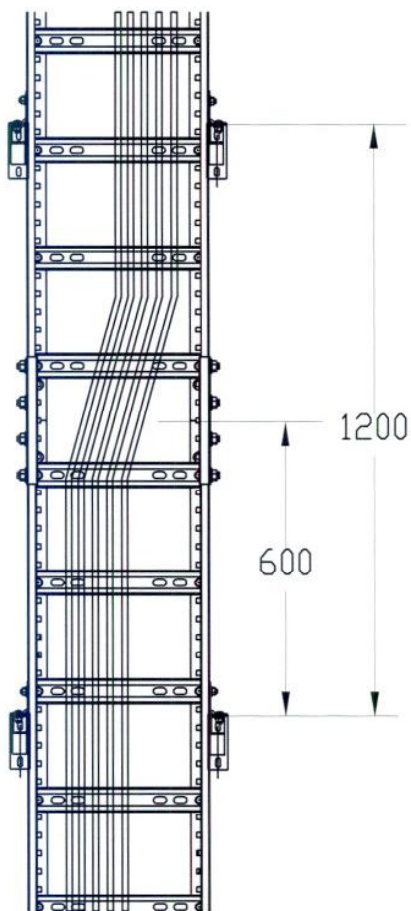


**AKS** Profesjonalne Systemy Tras Kablowych



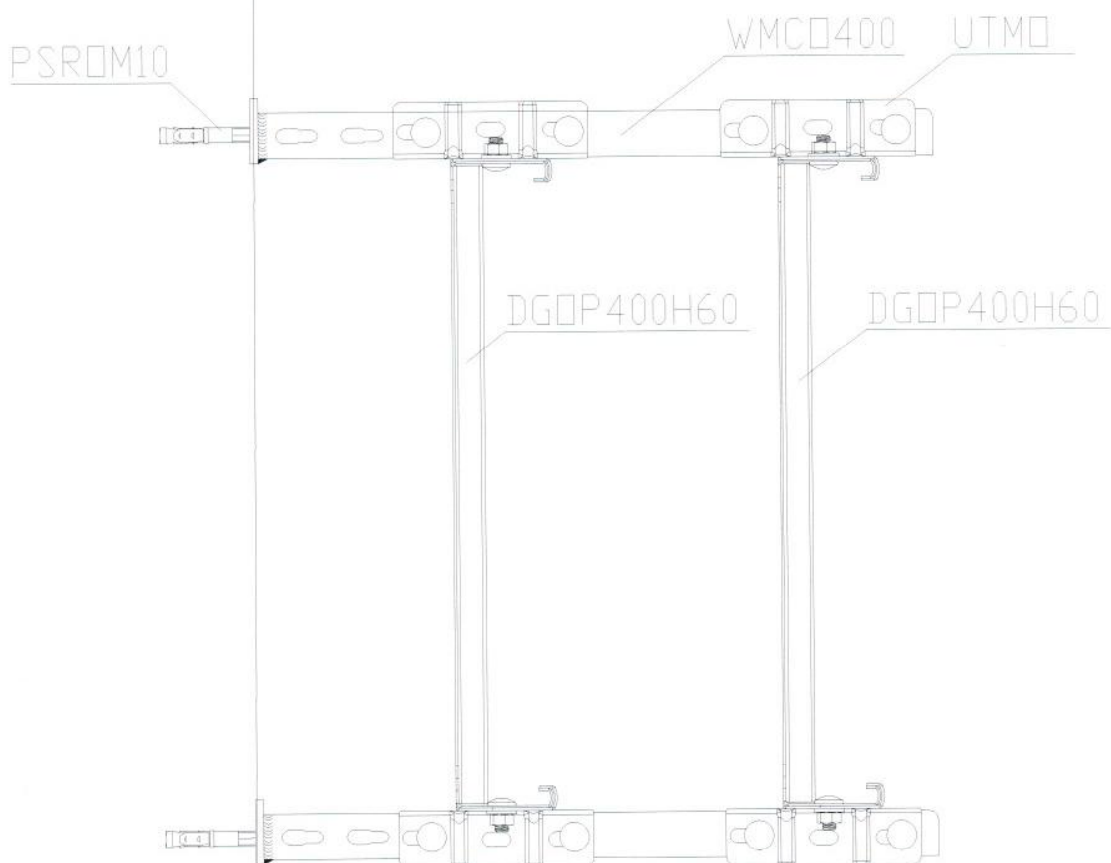
|                                               |  |                                               |  |                            |  |            |  |                             |  |
|-----------------------------------------------|--|-----------------------------------------------|--|----------------------------|--|------------|--|-----------------------------|--|
| Dokumentacja<br>wykonawcza<br>niezawieszająca |  | Gatunek<br>Nr normy<br>półfabrykat (nr normy) |  | Masa [kg]                  |  | Podziałka  |  | Format<br>Arkusz<br>Arkuszy |  |
|                                               |  |                                               |  | PN-EN 10327:2005           |  |            |  | A4<br>3<br>5                |  |
| Projektował                                   |  | Data                                          |  | Nazwa rysunku              |  |            |  |                             |  |
| Rysował                                       |  | Podpis                                        |  |                            |  |            |  |                             |  |
| Sprawdził                                     |  | Jędrzejowski                                  |  |                            |  |            |  |                             |  |
| Zatwierdził                                   |  | Nozwicko                                      |  |                            |  |            |  |                             |  |
|                                               |  | Profesjonalne Systemy<br>Tras Kablowych       |  | Nr programu<br>maszynowego |  | Nr rysunku |  | Nr zmiany                   |  |
|                                               |  |                                               |  |                            |  |            |  |                             |  |
|                                               |  |                                               |  |                            |  |            |  |                             |  |

|                                                             |  |                                                  |  |
|-------------------------------------------------------------|--|--------------------------------------------------|--|
| <b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE |  | Dátum/Date<br>16.01.2009<br>Podpis/Signature<br> |  |
| Dokument č. <b>FIRES-FR-006-09-AVE</b><br>Document No.      |  | Priloha č./Appendix Nb. <b>53</b>                |  |



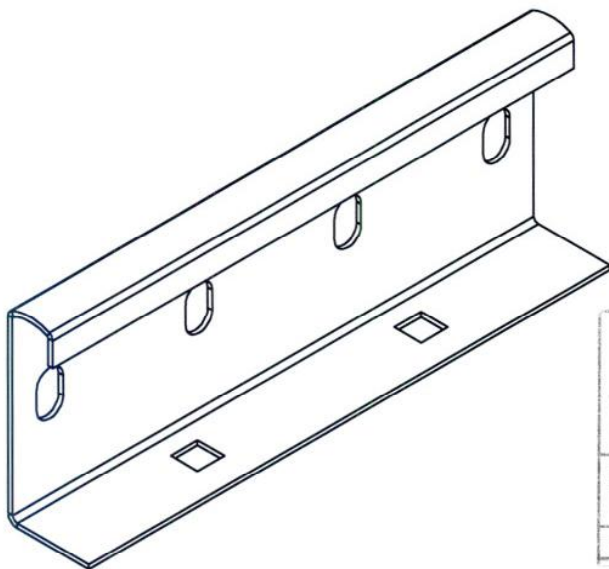
|                                                                                                                                                     |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br><i>16. 01. 2009</i>      |
|                                                                                                                                                     | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. <i>FIRES-FR-009-09-AWE</i>                                                                                                              |                                        |
| Document No. <i>54</i>                                                                                                                              |                                        |
| Príloha č./Appendix No. <i>54</i>                                                                                                                   |                                        |

|                                         |                                          |        |          |                         |                  |           |           |           |
|-----------------------------------------|------------------------------------------|--------|----------|-------------------------|------------------|-----------|-----------|-----------|
|                                         | Dłuchylka<br>wymiarów<br>nietolerowanych |        | Material | Gatunek                 |                  | Masa [kg] | Podziałka | Format    |
|                                         |                                          |        |          | Nr normy                | PN-EN 10327-2005 |           |           | Arkusz    |
|                                         |                                          |        |          | polfabrykat (nr normy)  |                  |           |           | Arkuszy   |
| Projektował                             | Nazwisko<br>J.Grochowski                 | Podpis | Data     | Nazwa rysunku           |                  |           |           |           |
| Rysował                                 |                                          |        |          |                         |                  |           |           |           |
| Sprawdził                               |                                          |        |          |                         |                  |           |           |           |
| Zatwierdził                             |                                          |        |          |                         |                  |           |           |           |
|                                         |                                          |        |          | Nr programu maszynowego |                  |           |           | Nr zmiany |
|                                         |                                          |        |          | Nr rysunku              |                  |           |           |           |
| Profesjonalne Systemy<br>Tras Kablowych |                                          |        |          |                         |                  |           |           |           |
|                                         |                                          |        |          |                         |                  |           |           |           |
|                                         |                                          |        |          |                         |                  |           |           |           |
|                                         |                                          |        |          |                         |                  |           |           |           |

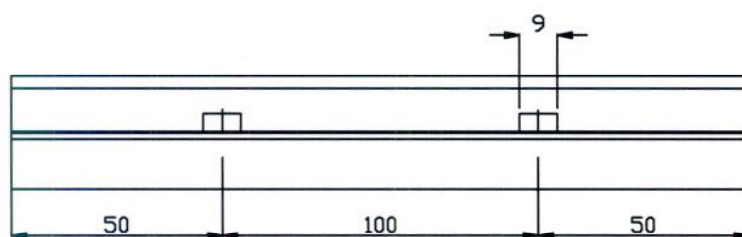
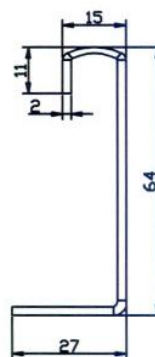
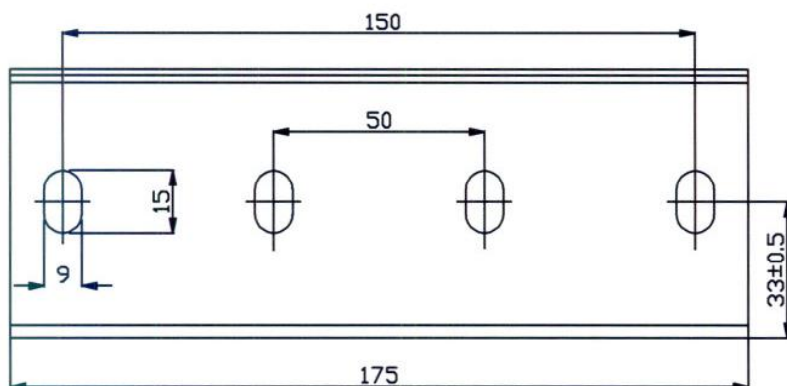


|                                                                                                                                                    |                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <br><b>FIRES s.r.o.</b><br>POŽIARNÁ ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br><b>16. 01. 2009</b>                     |
|                                                                                                                                                    | Podpis/Signature<br><i>[Signature]</i>                |
|                                                                                                                                                    | Dokument č. /Document No. <b>FIRES-FR-004-09-ANNE</b> |
| Príloha č./Appendix No. <b>55</b>                                                                                                                  |                                                       |

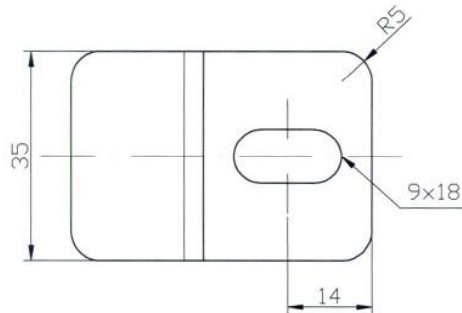
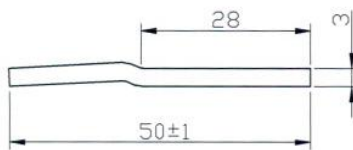
|                                           |                |                                               |                |
|-------------------------------------------|----------------|-----------------------------------------------|----------------|
| Materiál<br>Rodzaj<br>Gatunek<br>Nr normy | Bl. ocynkowana | Nazwa rysunku<br>Rysunek konstrukcja drabinka | Podzeta<br>1:1 |
|                                           |                |                                               |                |
|                                           |                |                                               |                |
| Profesjonalne Systemy Tras Kablowych      |                | BAKS-TECHNOKABEL<br>FIRES 12-16 01 2009rok    |                |



|                                                                                                                                                  |                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <br><b>FIRES</b> s.r.o.<br>POŽIARNA ODOLNOST<br>FIRE RESISTANCE | Dátum/Date<br><i>16. 01. 2009</i> |
|                                                                                                                                                  | Podpis/Signature<br><i>Jolana</i> |
| Dokument č. <i>FIRES-FR-004-09-ANNE</i><br>Document No.                                                                                          |                                   |
| Príloha č./Appendix No. <i>56</i>                                                                                                                |                                   |

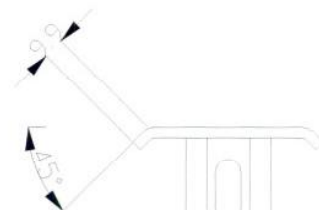
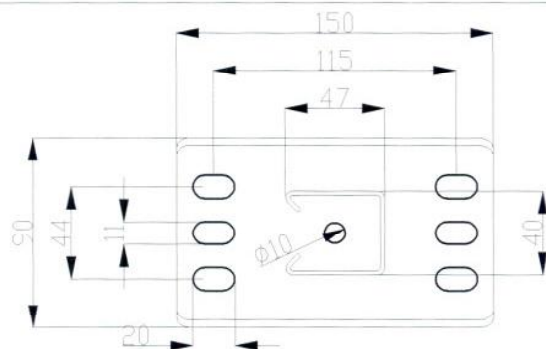


|                                                                                     |                                        |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------|----------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--|--|--|--|--|--|--|--|
|  | Długość (wymiarów)<br>nie tolerowanych | Materiał<br>Blach stalocynk. i niet.Senzdżirna       | Masa (kg)                        | Podziałka | Format A4<br>Arkusz<br>Arkuszy                                                                                                                                   |                                                     |  |  |  |  |  |  |  |  |
|                                                                                     |                                        |                                                      |                                  |           |                                                                                                                                                                  | Nr normy PN-EN 10327:2005<br>półfabrykat (nr normy) |  |  |  |  |  |  |  |  |
| Projektował                                                                         | J.GROCHOŃSKI                           | Data<br>20.10.05<br>20.10.05<br>20.10.05<br>20.10.05 | Nazwa rysunku<br><b>L DCH60N</b> |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
| Rysował                                                                             | J.Grochoński                           |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
| Sprawdził                                                                           | T.WŁODARCZYK                           |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
| Zatwierdził                                                                         | J.KLICZEK                              |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
| Profesjonalne Systemy<br>Tras Kablowych                                             |                                        |                                                      | Nr rysunku<br><b>863000</b>      |           | Nr zmiany<br><table border="1"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> |                                                     |  |  |  |  |  |  |  |  |
|                                                                                     |                                        |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
|                                                                                     |                                        |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |
|                                                                                     |                                        |                                                      |                                  |           |                                                                                                                                                                  |                                                     |  |  |  |  |  |  |  |  |



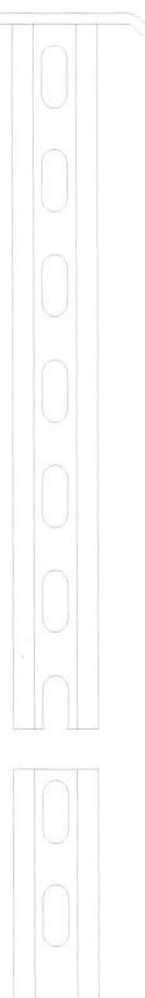
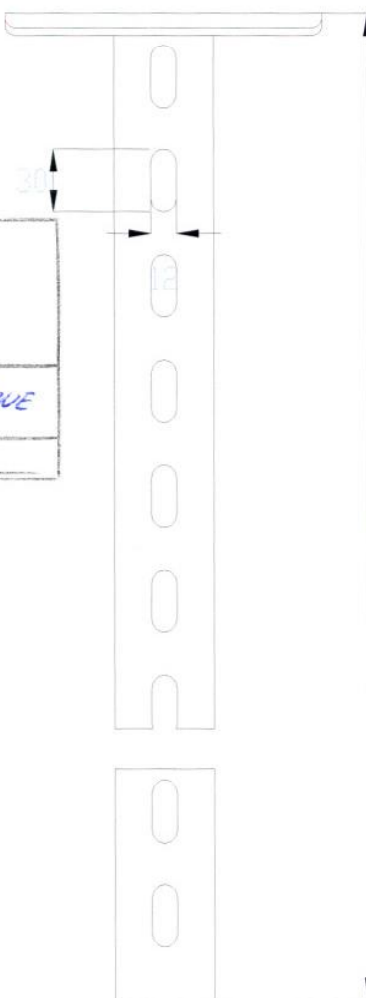
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| <br><b>FIRES S.T.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009         |
|                                                                                                                                                    | Podpis/Signature<br><i>J. K.</i> |
| Dokument č. <i>FIRES-FR-004-09-ANNE</i><br>Document No.                                                                                            |                                  |
| Príloha č./Appendix N5. <i>54</i>                                                                                                                  |                                  |

|                                                                                                                             |                                       |           |                        |               |                  |           |           |           |      |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|------------------------|---------------|------------------|-----------|-----------|-----------|------|
|                                          | Długość<br>wymiarów<br>nieolerowanych | $\pm 0,5$ | Materiał               | Gatunek       | -----            | Masa [kg] | Podziałka | Format A4 |      |
|                                                                                                                             |                                       |           |                        | Nr normy      | PN-EN 10327:2005 |           |           |           | 0,04 |
|                                                                                                                             |                                       |           | półfabrykat (nr normy) |               | -----            |           |           |           |      |
| Projektował                                                                                                                 | Tomasz Grudniewski                    | Podpis    | Data                   | Nazwa rysunku |                  |           |           |           |      |
| Rysował                                                                                                                     | Jakub Rudak                           |           |                        | ZMO           |                  |           |           |           |      |
| Sprawdził                                                                                                                   | Jacek Kliczek                         |           |                        |               |                  |           |           |           |      |
| Zatwierdził                                                                                                                 | Jacek Kliczek                         |           |                        |               |                  |           |           |           |      |
|                                                                                                                             |                                       |           | Nr rysunku             |               |                  |           |           | Nr zmiany |      |
|  Profesjonalne Systemy<br>Tras Kablowych |                                       |           | 802900                 |               |                  |           |           |           |      |

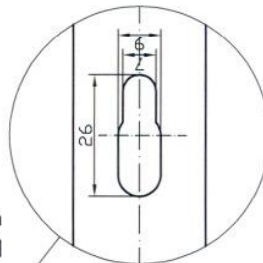
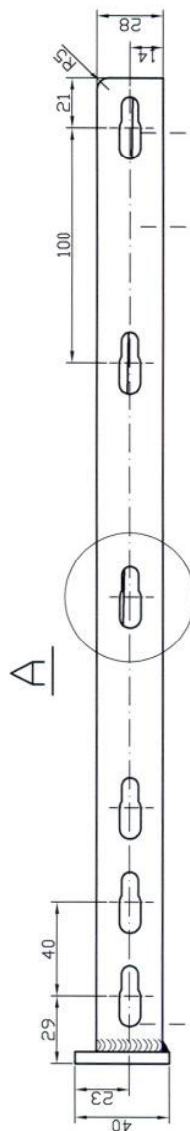


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|  <b>FIRES s.r.o.</b><br>POŽIARNA ODOLNOST<br>FIRE RESISTANCE | Dátum/Date<br><i>16. 01. 2009</i>      |
|                                                                                                                                               | Podpis/Signature<br><i>[Signature]</i> |
| Dokument č. / Document No. <i>FIRES-FR-004-09-AWE</i>                                                                                         |                                        |
| Príloha č./Appendix No. <i>58</i>                                                                                                             |                                        |

| L    | Typ      | Nr.kat |
|------|----------|--------|
| 200  | WPCD200  | 800820 |
| 300  | WPCD300  | 800830 |
| 400  | WPCD400  | 800840 |
| 500  | WPCD500  | 800850 |
| 600  | WPCD600  | 800860 |
| 700  | WPCD700  | 800870 |
| 800  | WPCD800  | 800880 |
| 900  | WPCD900  | 800890 |
| 1000 | WPCD1000 | 800900 |

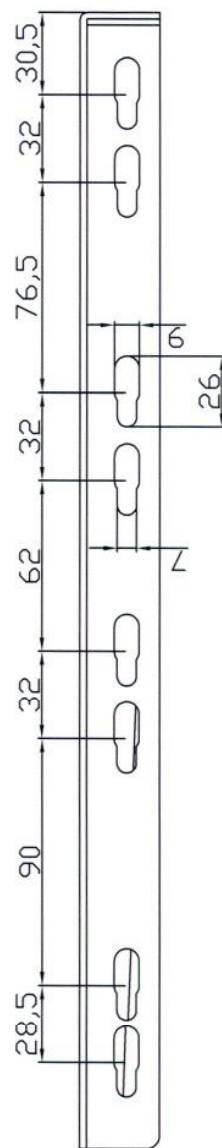


|                                                                                                                            |                                                              |                                            |                                                             |                                                      |                                                                       |                                             |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------|
|  Dýchadlo<br>výfukový<br>netolerovaných | T. Grudniewski<br>T. Grudniewski<br>J. Kliczek<br>J. Kliczek | Podpis<br>_____<br>_____<br>_____<br>_____ | Materiál<br>Gotunek<br>Nr. normy<br>półfabrykat (nr. normy) | Waga [kg]<br>--                                      | Podziałka<br>1:3                                                      | Format<br>A4<br>Arkusz<br>1<br>Arkuszy<br>1 |
|                                                                                                                            |                                                              |                                            | Projektował<br>Rysował<br>Sprawdził<br>Zatwierdził          | Data<br>03.17.04<br>03.17.04<br>03.17.04<br>03.17.04 | Nazwa rysunku<br>WPCD<br>Nr programu maszynowego<br>---<br>Nr rysunku | Nr zmiany<br>_____<br>_____<br>_____        |
| Profesjonalne Systemy<br>Tras Kablowych                                                                                    |                                                              |                                            |                                                             |                                                      |                                                                       |                                             |



|                             |                                      |
|-----------------------------|--------------------------------------|
|                             | Dátum/Date                           |
|                             | Požiarna odolnosť<br>FIRE RESISTANCE |
| Dokument č.<br>Document No. | Podpis/Signature                     |
| Príloha č./Appendix No.     | 59                                   |

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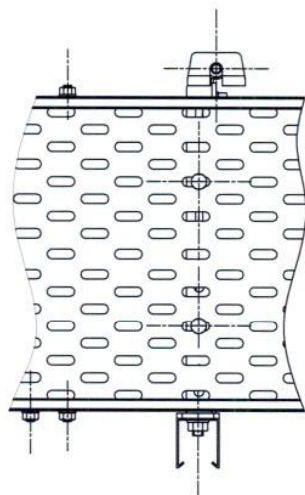


| <i>A</i> | <i>Typ</i>         | <i>Nr.kat</i> |
|----------|--------------------|---------------|
| 115      | W/WS $\square$ 100 |               |
| 215      | W/WS $\square$ 200 |               |
| 315      | W/WS $\square$ 300 |               |
| 415      | W/WS $\square$ 400 |               |

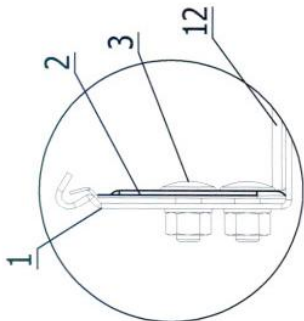
|                                                                                                                                                           |                                                                                     |                                                              |                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------|
|  <p><b>FIRES</b> S.T.O.<br/>POŽIARNA ODOLNOSŤ<br/>FIRE RESISTANCE</p> | <p>Dátum/Date<br/><i>16.01.2009</i></p> <p>Podpis/Signature<br/><i>J. János</i></p> | <p>Dokument č.<br/>Document No. <i>FIRES-FR-0001-AWE</i></p> | <p>Príloha č./Appendix No. <i>60</i></p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------|

[illegible]

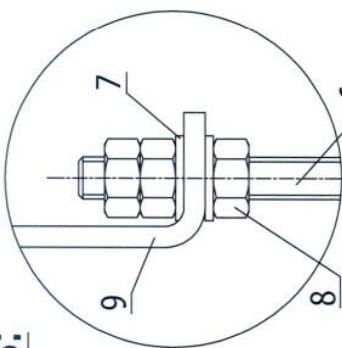
D-D



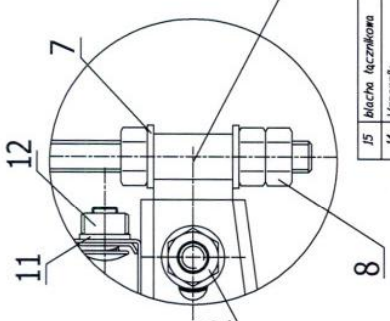
A:



B:



C:



D

**FIRES S.R.O.**  
POZIARNA ODOLNOST  
FIRE RESISTANCE

Dokument č. **FIRES-FR-026-09-ANE**  
Document No. **67**

Dátum/Date **16.01.2009**  
Podpis/Signature **[Signature]**

| Poz.1 |               | Poz.4   |  |
|-------|---------------|---------|--|
| A     | Typ           | Typ     |  |
| 100   | KCDNP100H60/3 | WNCI100 |  |
| 200   | KCDNP200H60/3 | WNCI200 |  |
| 300   | KCDNP300H60/3 | WNCI300 |  |
| 400   | KCDNP400H60/3 | WNCI400 |  |

| Pos.      | Benennung           | Zeichnung-Nr. | Material        | Stück | Katalogs Nr. |
|-----------|---------------------|---------------|-----------------|-------|--------------|
| 15        | blacha łącznikowa   | BLN400        |                 | 1     | 862440       |
| 14        | Wspornik            | WPC1          |                 | 1     | 800830       |
| 8         | śruba               | SN M10x30     |                 | 2     | 650843       |
| 12        | nakrętka            | NS M8         |                 | 16    | 650144       |
| 11        | podkładka           | PP 8          |                 | 16    | 650444       |
| 10        | śruba               | SN M6x16      |                 | 2     | 650443       |
| 9         | uchwyt sufitowy     | USDV          |                 | 1     | 803700       |
| 8         | nakrętka            | NS M10        |                 | 8     | 650244       |
| 7         | podkładka           | PP 10         |                 | 8     | 650544       |
| 6         | pret gwintowany     | POMIL1        |                 | 1     | 651001       |
| 5         | uchwyt              | UPW1          |                 | 1     | 803300       |
| 4         | wysięgnak           | WNCI400       | FR-130 H40W     | 1     | 800340       |
| 3         | śruba               | SN M6x12      |                 | 14    | 650641       |
| 2         | łacznik             | LPCNP400      |                 | 2     | 860700       |
| 1         | koryto              | KCDNP400H60/3 | FR-130 H40W/097 | 1     | 862040       |
| Benennung |                     | Zeichnung-Nr. | Material        | Stück | Katalogs Nr. |
| 15        | gelochte Stahlblech | BLN400        |                 | 1     | 862440       |
| 14        | Wspornik            | WPC1          |                 | 1     | 800830       |
| 8         | śruba               | SN M10x30     |                 | 2     | 650843       |
| 12        | nakrętka            | NS M8         |                 | 16    | 650144       |
| 11        | podkładka           | PP 8          |                 | 16    | 650444       |
| 10        | śruba               | SN M6x16      |                 | 2     | 650443       |
| 9         | uchwyt sufitowy     | USDV          |                 | 1     | 803700       |
| 8         | nakrętka            | NS M10        |                 | 8     | 650244       |
| 7         | podkładka           | PP 10         |                 | 8     | 650544       |
| 6         | pret gwintowany     | POMIL1        |                 | 1     | 651001       |
| 5         | uchwyt              | UPW1          |                 | 1     | 803300       |
| 4         | wysięgnak           | WNCI400       | FR-130 H40W     | 1     | 800340       |
| 3         | śruba               | SN M6x12      |                 | 14    | 650641       |
| 2         | łacznik             | LPCNP400      |                 | 2     | 860700       |
| 1         | koryto              | KCDNP400H60/3 | FR-130 H40W/097 | 1     | 862040       |



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ul. Jagodne 5 05-480  
Korczew

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D-D

14; 9; 8

11; 12; 13

D

15

B

C

11; 12; 13

A

C

A:

B:



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POŽIARNÁ ODOLNOST  
FIRE RESISTANCE

Dátum/Date  
*6.01.2009*

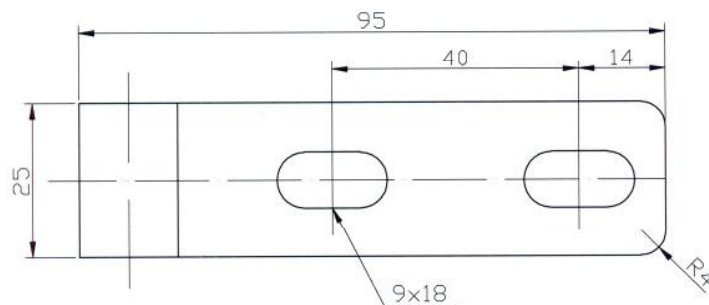
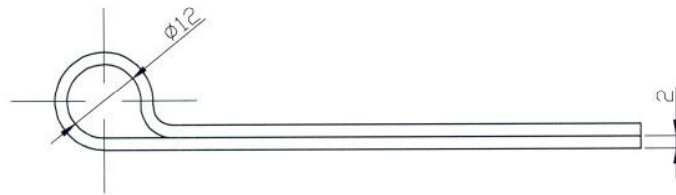
Podpis/Signature  
*Flacis*

Dokument č. *FIRES-FR-004-09-ANF*  
Document No.

Příloha č./Appendix No. *62*

| 15                                                                                                                                                                                                                                                                                                                             | esponník                          | WPCD          | 1        | 800840       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|----------|--------------|
| 13                                                                                                                                                                                                                                                                                                                             | šroub                             | SM M10x20     | 2        | 650843       |
| 12                                                                                                                                                                                                                                                                                                                             | matice                            | NS M8         | 8        | 650144       |
| 11                                                                                                                                                                                                                                                                                                                             | podklad                           | PP 8          | 8        | 650444       |
| 10                                                                                                                                                                                                                                                                                                                             | šroub                             | SGM8x16       | 4        | 650443       |
| 9                                                                                                                                                                                                                                                                                                                              | uchyt svislý                      | USDV          | 1        | 803700       |
| 8                                                                                                                                                                                                                                                                                                                              | matice                            | NS M10        | 8        | 650244       |
| 7                                                                                                                                                                                                                                                                                                                              | pret gntový                       | PGM10_1       | 1        | 651001       |
| 6                                                                                                                                                                                                                                                                                                                              | uchyt                             | UPW1          | 1        | 803300       |
| 5                                                                                                                                                                                                                                                                                                                              | záclik nacújacy                   | ZND           | 2        | 802900       |
| 4                                                                                                                                                                                                                                                                                                                              | výšlepník                         | VMC1400       | 1        | 800340       |
| 3                                                                                                                                                                                                                                                                                                                              | šroub                             | SG M8x14      | 4        | 650142       |
| 2                                                                                                                                                                                                                                                                                                                              | laczník                           | LJDNCH60      | 2        | 863000       |
| 1                                                                                                                                                                                                                                                                                                                              | drabík                            | LDGNP400060   | 1        | 863043       |
| Pos.                                                                                                                                                                                                                                                                                                                           | Benennung                         | Zeichnung-Nr. | Material | Katalogs-Nr. |
| gekonstruirt                                                                                                                                                                                                                                                                                                                   | konstruoval                       | 021106        |          |              |
| gezeichnet                                                                                                                                                                                                                                                                                                                     | konstruoval                       | 021106        |          |              |
| geprüft                                                                                                                                                                                                                                                                                                                        | konstruoval                       | 021106        |          |              |
| Masstab                                                                                                                                                                                                                                                                                                                        |                                   |               |          |              |
| 15                                                                                                                                                                                                                                                                                                                             | LEITER INP400060/2 + AUSLEGER VMC | Fire          |          |              |
| <div> <div>  <p><b>BAKS</b><br/>DZIAŁ KONSTRUKCYJNY<br/>ul. Jagodze 5 05-480<br/>Karczew</p> </div> <div> <p>Blatt 1 von 1<br/>Größe A3</p> <p>Name<br/><b>Feuerbestandig System</b></p> <p>Vorbereitend<br/>Vorhaben-Nr.</p> </div> </div> |                                   |               |          |              |

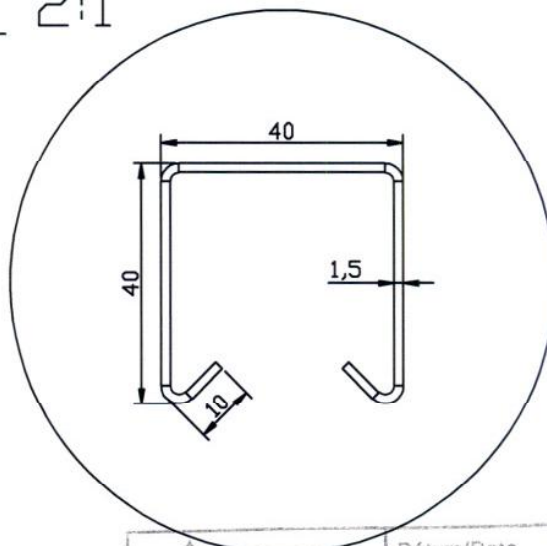
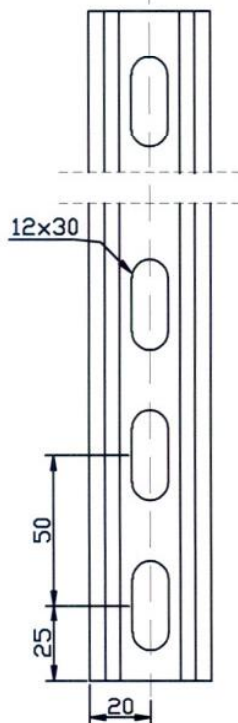
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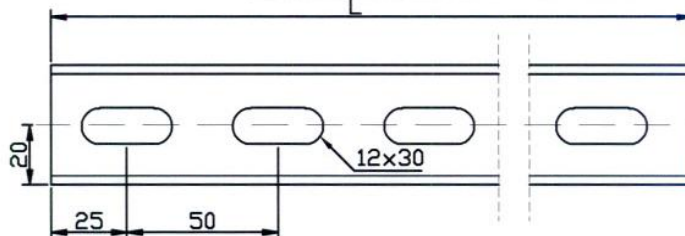
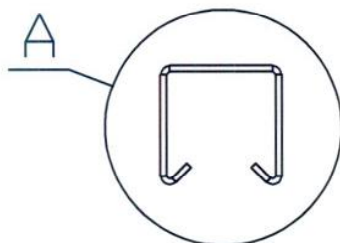
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|---------------------------------------------------------|----------------------------------|
|                                                         | Dátum/Date<br>16.01.2009         |
|                                                         | Podpis/Signature<br><i>Jacek</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-09-ANNE</i> |                                  |
| Príloha č./Appendix No. <i>63</i>                       |                                  |

|                                         |                                                     |                                                                                                 |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
|                                         | Odchyłka<br>wyniarów<br>nietolerowanych<br><br>±0,5 | Materiał<br>Gatunek<br>-----<br>Nr normy<br>PN-EN 10327:2005<br>półfabrykat (nr normy)<br>----- | Masa [kg]<br>----<br>Podziałka<br>1:1 | Format<br>A4<br>Arkusz --<br>Arkuszy --                                                                                                                          |  |  |  |  |  |  |  |  |  |
|                                         |                                                     |                                                                                                 |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Projektował                             | Jacek Grochowski                                    | 12.02.04                                                                                        | Nazwa rysunku<br><i>UPW□</i>          |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Rysował                                 | Jakub Rudak                                         | 20.02.08                                                                                        |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Sprawdził                               | Jacek Kliček                                        | 20.02.08                                                                                        |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Zatwierdził                             | Jacek Kliček                                        | 20.02.08                                                                                        |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Profesjonalne Systemy<br>Tras Kablowych |                                                     | Nr rysunku<br><i>803300</i>                                                                     |                                       | Nr zmiany<br><table border="1"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> |  |  |  |  |  |  |  |  |  |
|                                         |                                                     |                                                                                                 |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
|                                         |                                                     |                                                                                                 |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
|                                         |                                                     |                                                                                                 |                                       |                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |

A 2:1



|                                                                 |                                   |
|-----------------------------------------------------------------|-----------------------------------|
| <br><b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009          |
|                                                                 | Podpis/Signature<br><i>Y. daš</i> |
| Dokument č. / Document No. <i>FIRES-FR-009-09-AWE</i>           |                                   |
| Príloha č. / Appendix No. <i>64</i>                             |                                   |



|    |                    |               |               |        |           |
|----|--------------------|---------------|---------------|--------|-----------|
| 5  | Ceownik wzmacniony | CWOP40H40/ 2E | 805320        | 2000   | 3,50      |
| 4  | Ceownik wzmacniony | CWOP40H40/05E | 805305        | 500    | 0,88      |
| 3  | Ceownik wzmacniony | CWOP40H40/04E | 805304        | 400    | 0,70      |
| 2  | Ceownik wzmacniony | CWOP40H40/03E | 805303        | 300    | 0,53      |
| 1  | Ceownik wzmacniony | CWOP40H40/02E | 805302        | 200    | 0,35      |
| LP | Nazwa wyrobu       | Symbol        | Nr Katalogowy | L [mm] | Masa [kg] |

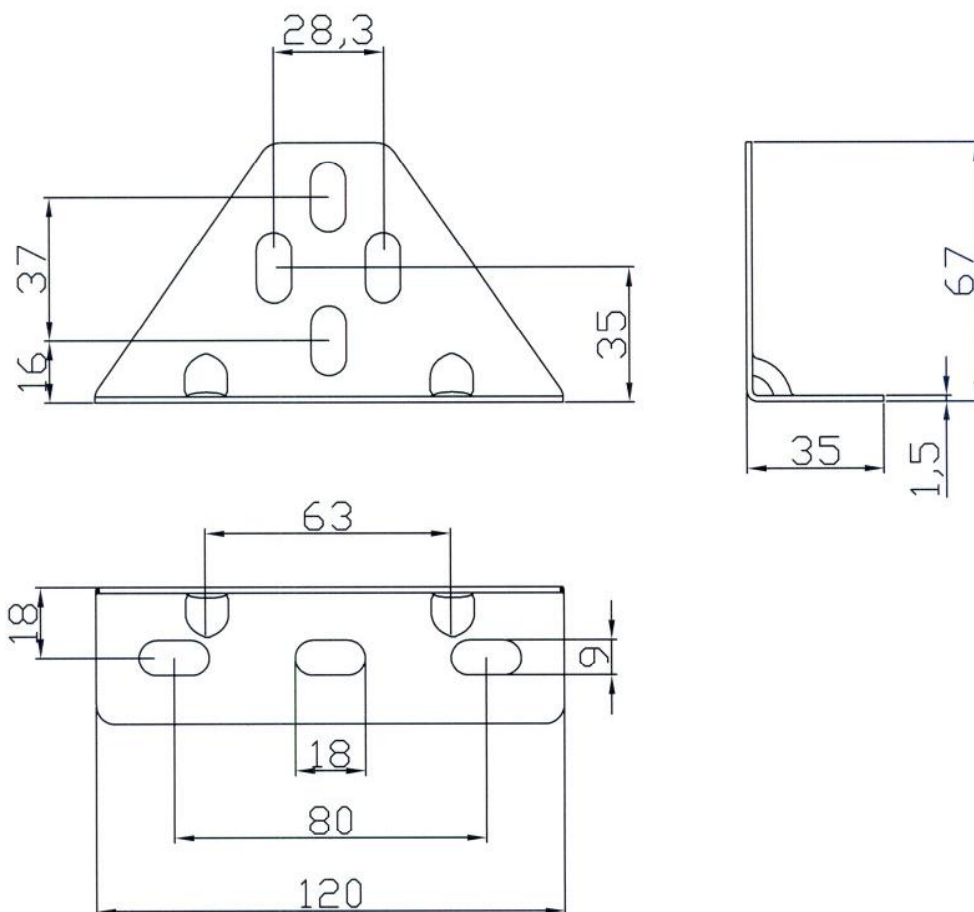
|                                             |                                                        |                                                                                               |                                 |                  |            |
|---------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------|------------------|------------|
| <br>Odczytka<br>symbolu<br>nie tolerowanych | Grubość (mm)<br>1,5                                    | Materiał<br>Blacha kwasoodporna<br>Nr normy<br>PN DIN 1819<br>podfabrykat (nr normy)<br>----- | Masa [kg]<br>---                | Podziałka<br>1:1 | Format A4  |
|                                             |                                                        |                                                                                               |                                 |                  | Arkusz --- |
| Projektant<br>Jacek Grochowski              | Nazwa<br>Jacek Rudak<br>Jacek Kliczek<br>Jacek Kliczek | Data<br>20.10.05<br>20.02.08<br>20.02.08<br>20.02.08                                          | Nazwa rysunku<br>CWOP40H40/...E |                  |            |
| Rysował                                     |                                                        |                                                                                               | Nr rysunku<br>8053.....         | Nr zmiany        |            |
| Sprawdził                                   |                                                        |                                                                                               |                                 | ---              |            |
| Zatwierdził                                 |                                                        |                                                                                               |                                 | ---              |            |
| Profesjonalne Systemy<br>Tras Kablowych     |                                                        |                                                                                               | ---                             |                  |            |



| $L$ | $Typ$    | $Nr.kat$ |
|-----|----------|----------|
| 170 | WFLD 100 |          |
| 270 | WFLD 200 |          |
| 370 | WFLD 300 |          |
| 470 | WFLD 400 |          |
| 570 | WFLD 500 |          |

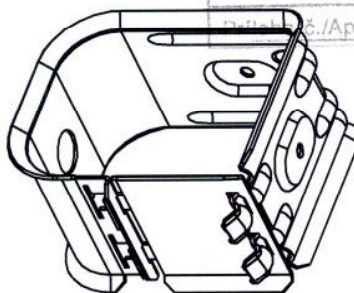
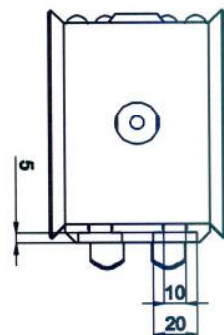
|                                                                                                                                                          |                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
|  <p><b>FIRES</b> s.r.o.<br/>POŽIARNA ODOLNOST<br/>FIRE RESISTANCE</p> | <p>Dátum/Date<br/><i>16.01.2009</i></p>        |
| <p>Dokument č. <i>F125-M-09-AN-E</i></p>                                                                                                                 | <p>Podpis/Signature<br/><i>[Signature]</i></p> |
| <p>Príloha č./Appendix No. <i>65</i></p>                                                                                                                 |                                                |

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|                                                                                                                                                     |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <br><b>FIRES s.r.o.</b><br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br>16. 01. 2009          |
|                                                                                                                                                     | Podpis/Signature<br><i>J. J. J.</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-09-PRUE</i>                                                                                             |                                     |
| Príloha č./Appendix No. <i>66</i>                                                                                                                   |                                     |

|                                                                                                                             |                                                                 |                                                  |                                    |                    |                  |                                   |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------|------------------------------------|--------------------|------------------|-----------------------------------|
|                                          | Odchytky<br>výměrů<br>netolerovaných                            | Materiál<br>Nr. normy<br>półfabrykat (nr. normy) | Gatunek<br>-----<br>-----<br>----- | Masa (kg)<br>----- | Podziałka<br>1:1 | Format<br>A3<br>Arkusz<br>Arkuszy |
|                                                                                                                             |                                                                 |                                                  |                                    |                    |                  |                                   |
| Projektował<br>Rysował<br>Sprawdził<br>Zatwierdził                                                                          | Nazwisko<br>M. Stawikowski<br>Podpis<br>_____<br>_____<br>_____ | Data<br>13.10.08                                 | Nazwa rysunku<br>UTMO              |                    |                  |                                   |
|  Profesjonalne Systemy<br>Tras Kablowych |                                                                 |                                                  | Nr. katalogu<br>-----              |                    |                  |                                   |

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 **FIRES s.r.o.**  
POŽIARNA ODOLNOSŤ  
FIRE RESISTANCE

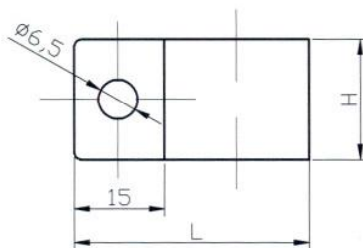
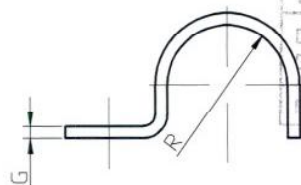
Dokument č. *F1925-FR-004-09-AWE*  
Document No.

č./Appendix No.

Dátum/Date

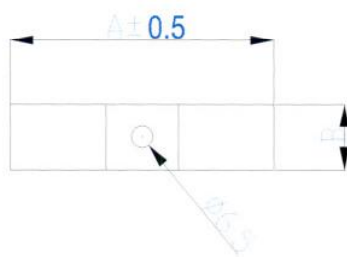
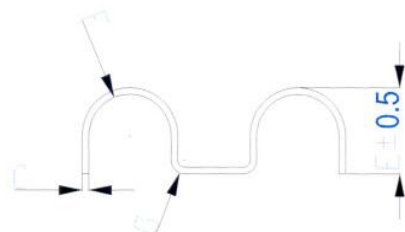
16.01.2009

Podpis / Signature



|    |               |        |               |        |        |        |        |
|----|---------------|--------|---------------|--------|--------|--------|--------|
| 20 | Uchwyty kabla | UDF 43 | 405543        | 21,5   | 60,0   | 20,0   | 2,0    |
| 19 | Uchwyty kabla | UDF 40 | 405540        | 20,0   | 57,0   | 20,0   | 2,0    |
| 18 | Uchwyty kabla | UDF 37 | 405537        | 18,5   | 54,0   | 20,0   | 2,0    |
| 17 | Uchwyty kabla | UDF 34 | 405534        | 17,0   | 51,0   | 20,0   | 2,0    |
| 16 | Uchwyty kabla | UDF 31 | 405531        | 15,5   | 48,0   | 20,0   | 2,0    |
| 15 | Uchwyty kabla | UDF 28 | 405528        | 14,0   | 45,0   | 20,0   | 2,0    |
| 14 | Uchwyty kabla | UDF 25 | 405525        | 12,5   | 44,0   | 20,0   | 2,0    |
| 13 | Uchwyty kabla | UDF 22 | 405522        | 11,0   | 41,0   | 14,0   | 2,0    |
| 12 | Uchwyty kabla | UDF 20 | 405520        | 10,0   | 39,0   | 14,0   | 2,0    |
| 11 | Uchwyty kabla | UDF 18 | 405518        | 9,0    | 37,0   | 14,0   | 2,0    |
| 10 | Uchwyty kabla | UDF 16 | 405516        | 8,0    | 35,0   | 14,0   | 2,0    |
| 9  | Uchwyty kabla | UDF 15 | 405515        | 7,5    | 34,0   | 14,0   | 2,0    |
| 8  | Uchwyty kabla | UDF 14 | 405514        | 7,0    | 33,0   | 14,0   | 1,2    |
| 7  | Uchwyty kabla | UDF 12 | 405512        | 6,0    | 30,0   | 14,0   | 1,2    |
| 6  | Uchwyty kabla | UDF 10 | 405510        | 5,0    | 28,0   | 14,0   | 1,2    |
| 5  | Uchwyty kabla | UDF 9  | 405509        | 4,5    | 27,0   | 14,0   | 1,2    |
| 4  | Uchwyty kabla | UDF 8  | 405508        | 4,0    | 26,0   | 14,0   | 1,2    |
| 3  | Uchwyty kabla | UDF 7  | 405507        | 3,5    | 25,0   | 14,0   | 1,2    |
| 2  | Uchwyty kabla | UDF 6  | 405506        | 3,0    | 24,0   | 14,0   | 1,2    |
| 1  | Uchwyty kabla | UDF 5  | 405505        | 2,5    | 23,0   | 14,0   | 1,2    |
| LP | Nazwa wyrobu  | Symbol | Nr Katalogowy | R [mm] | L [mm] | H [mm] | G [mm] |

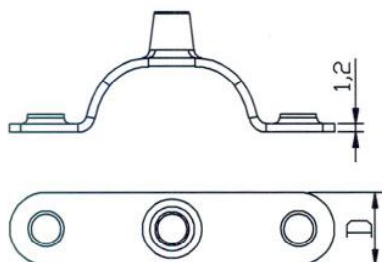
|                                         |                                    |           |                                                 |                                      |                           |                  |             |
|-----------------------------------------|------------------------------------|-----------|-------------------------------------------------|--------------------------------------|---------------------------|------------------|-------------|
|                                         | Długość<br>wymiary<br>niezależnych | $\pm 0,5$ | Metryczka<br>Nr normy<br>półfabrykat (nr normy) | Gatunek<br>PN-EN 10327:2005<br>----- | Masa Dg<br>---            | Podziałka<br>1:1 | Format A4   |
|                                         |                                    |           |                                                 |                                      |                           |                  | Arkusze --- |
| Projektant                              | Jacek Grochowski                   | Podpis    | Data                                            | 20.10.05                             | Nazwa rysunku<br>UDF 5-43 |                  | Nr zmiany   |
| Rysownik                                | Jakub Rudak                        |           | Data                                            | 20.02.08                             |                           |                  |             |
| Sprawił                                 | Jacek Kliczek                      |           | Data                                            | 20.02.08                             |                           |                  |             |
| Zatwierdził                             | Jacek Kliczek                      |           | Data                                            | 20.02.08                             |                           |                  |             |
| Profesjonalne Systemy<br>Tras Kablowych |                                    |           | Nr rysunku<br>4055.....                         |                                      |                           |                  |             |



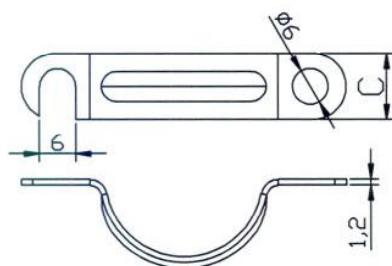
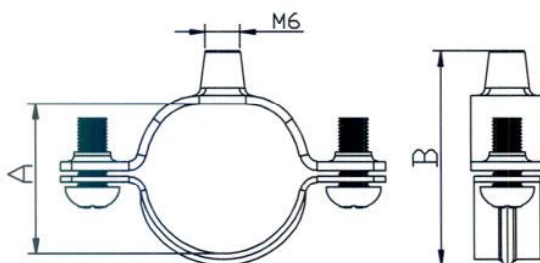
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|--------------------------------------------------------|--------------------------------|
|                                                        | Dátum/Date<br>16.01.2009       |
|                                                        | Podpis/Signature<br><i>Yda</i> |
| Dokument č.<br>Document No. <i>FIRES-FR-004-09-NWE</i> |                                |
| Príloha č./Appendix Nb. <i>69</i>                      |                                |

|       | A  | B  | C   | E  | F     | G    |
|-------|----|----|-----|----|-------|------|
| UEF5  | 38 | 14 | 1.2 | 5  | R2.5  | R2.4 |
| UEF6  | 40 | 14 | 1.2 | 6  | R3    | R2.4 |
| UEF7  | 42 | 14 | 1.2 | 7  | R3.5  | R2.4 |
| UEF8  | 44 | 14 | 1.2 | 8  | R4    | R2.4 |
| UEF9  | 46 | 14 | 1.2 | 9  | R4.5  | R2.4 |
| UEF10 | 48 | 14 | 1.2 | 10 | R5    | R2.4 |
| UEF12 | 52 | 14 | 1.2 | 12 | R6    | R2.4 |
| UEF14 | 58 | 20 | 2   | 15 | R7    | R4   |
| UEF15 | 60 | 20 | 2   | 16 | R7.5  | R4   |
| UEF16 | 62 | 20 | 2   | 17 | R8    | R4   |
| UEF18 | 66 | 20 | 2   | 19 | R9    | R4   |
| UEF20 | 70 | 20 | 2   | 21 | R10   | R4   |
| UEF22 | 74 | 20 | 2   | 23 | R11   | R4   |
| UEF25 | 80 | 20 | 2   | 26 | R12.5 | R4   |

|                                         |                                       |          |                         |                         |           |           |
|-----------------------------------------|---------------------------------------|----------|-------------------------|-------------------------|-----------|-----------|
|                                         | Uchytka<br>wyniorów<br>nieolerowanych | Materiał | Gatunek                 | Masa [kg]               | Podziałka | Format    |
|                                         |                                       |          | Nr normy                | PN-EN 10142 + A1 : 1997 |           | 1:1       |
|                                         |                                       |          | półfabrykat (nr normy)  |                         |           | Arkusz    |
|                                         |                                       |          |                         |                         |           | 1         |
| Projektował                             | JGRDCHOWSKI                           | Podpis   | Data                    | Nazwa rysunku           |           |           |
| Rysował                                 | JGRDCHOWSKI                           |          | 2010.04                 | UEF                     |           |           |
| Sprawdził                               | T.WŁODARCZYK                          |          | 2010.04                 |                         |           |           |
| Zatwierdził                             | JKLICZEK                              |          | 2010.04                 |                         |           |           |
|                                         |                                       |          | Nr programu maszynowego |                         |           | Nr zmiany |
|                                         |                                       |          | Nr rysunku              |                         |           |           |
| Profesjonalne Systemy<br>Tras Kablowych |                                       |          |                         |                         |           |           |

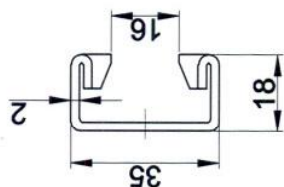


|                                                                                                                                                |                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
|  <b>FIRES S.R.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009                 |
|                                                                                                                                                | Podpis/Signature<br><i>J. Grochowski</i> |
| Dokument č. / Document No. <b>FIRES-FR-004-09-ANNE</b>                                                                                         |                                          |
| Príloha č./Appendix Nb. <b>40</b>                                                                                                              |                                          |



| symbol | A  | B  | C  | D  |
|--------|----|----|----|----|
| KSA 6  | 5  | 9  | 11 | 12 |
| KSA 8  | 7  | 15 | 11 | 12 |
| KSA 10 | 9  | 17 | 11 | 12 |
| KSA 12 | 11 | 19 | 11 | 12 |
| KSA 14 | 13 | 22 | 11 | 12 |
| KSA 16 | 15 | 24 | 11 | 12 |
| KSA 18 | 17 | 26 | 11 | 12 |
| KSA 20 | 19 | 27 | 11 | 12 |
| KSA 22 | 21 | 29 | 11 | 14 |
| KSA 24 | 23 | 31 | 11 | 14 |
| KSA 25 | 24 | 32 | 11 | 14 |
| KSA 26 | 25 | 33 | 11 | 14 |
| KSA 28 | 27 | 35 | 11 | 14 |
| KSA 32 | 31 | 39 | 11 | 14 |
| KSA 33 | 32 | 40 | 12 | 16 |
| KSA 35 | 34 | 42 | 12 | 16 |
| KSA 36 | 35 | 45 | 12 | 16 |
| KSA 40 | 39 | 47 | 12 | 16 |
| KSA 42 | 41 | 49 | 12 | 16 |
| KSA 48 | 46 | 56 | 14 | 16 |
| KSA 50 | 48 | 58 | 14 | 16 |
| KSA 55 | 53 | 62 | 14 | 16 |

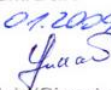
|                                                                                                                                |              |        |          |                             |           |                  |           |
|--------------------------------------------------------------------------------------------------------------------------------|--------------|--------|----------|-----------------------------|-----------|------------------|-----------|
|  Odchyłka<br>wymiarów<br>niezgodności       | Nazwisko     | Podpis | Materiał | Gatunek                     | Masa [kg] | Podziałka<br>1:1 | Format A4 |
|                                                                                                                                |              |        |          | Nr normy                    |           |                  |           |
| Projektował                                                                                                                    | J.GROCHOWSKI |        |          | 20.10.04                    |           |                  |           |
| Rysował                                                                                                                        | J.GROCHOWSKI |        |          | 20.10.04                    |           |                  |           |
| Sprawił                                                                                                                        | T.WŁODARCZYK |        |          | 20.10.04                    |           |                  |           |
| Zatwierdził                                                                                                                    | JKLICZEK     |        |          | 20.10.04                    |           |                  |           |
|  Profesjonalne<br>Systemy<br>Tras Kablowych |              |        |          | Nazwa rysunku<br><b>KSA</b> |           |                  |           |
|                                                                                                                                |              |        |          | Nr programu maszynowego     |           | ---              |           |
|                                                                                                                                |              |        |          | Nr rysunku                  |           | ---              |           |
|                                                                                                                                |              |        |          |                             |           |                  |           |

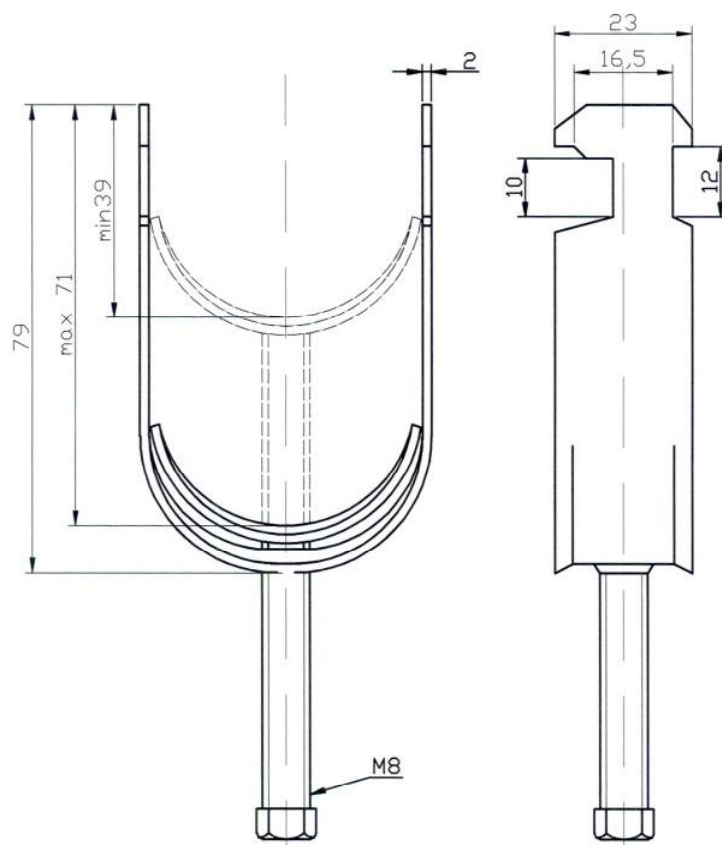


|              |              |               |                                                                                                                                                                                                               |                                          |                      |
|--------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------|
| 8            | Szczelbel    | SDDC 1000     | 990                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800190               |
| 7            | Szczelbel    | SDDC 800      | 790                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800180               |
| 6            | Szczelbel    | SDDC 600      | 590                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800160               |
| 5            | Szczelbel    | SDDC 500      | 490                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800150               |
| 4            | Szczelbel    | SDDC 400      | 390                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800140               |
| 3            | Szczelbel    | SDDC 300      | 290                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800130               |
| 2            | Szczelbel    | SDDC 200      | 190                                                                                                                                                                                                           | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800120               |
| 1            | Szczelbel    | SDDC 100      | 90                                                                                                                                                                                                            | Blstalcynk.net.ędzinlra PN-EN 10327:2005 | 800110               |
| <b>Pos.</b>  | <b>Nazwa</b> | <b>Symbol</b> | <b>Długość L (mm)</b>                                                                                                                                                                                         | <b>Materiał</b>                          | <b>Kodologia Nr.</b> |
| gekonstruier | M.Standort   | 02.10.2008    |  <p><b>BAKS</b><br/> <b>BAKS</b><br/> <b>dział konstrukcyjny</b><br/> <b>ul. Jagodnie 5 05-480</b><br/> <b>Karczew</b></p> |                                          |                      |
| geprüfert    |              |               |                                                                                                                                                                                                               |                                          |                      |
| Nachstuf     |              |               |                                                                                                                                                                                                               |                                          |                      |
|              |              |               | <p>Szczelbel SDDC.....</p>                                                                                                                                                                                    |                                          |                      |
| 1:1          |              |               | <p>Verfahren: Forschen</p>                                                                                                                                                                                    |                                          |                      |

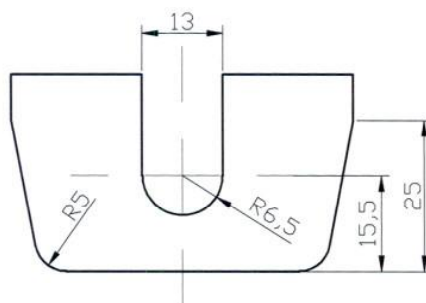
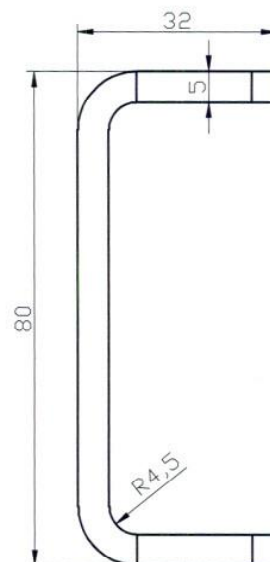
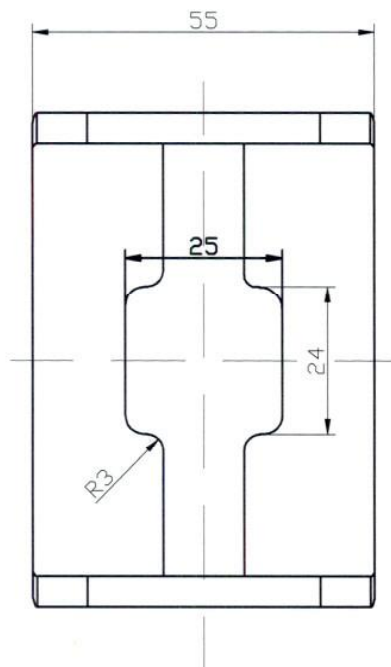
This drawing and its contents is the property of the BANC company and accepted or otherwise disclosed to any third party without our consent.

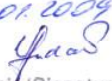
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|--------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------|
|  | FIRES s.r.o.<br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>   | Podpis/Signature<br> |
| Dokument č. <i>FIRE5-FR-014-03-AWE</i><br>Document No.                               |                                                      | Príloha č./Appendix No. <i>41</i> |                                                                                                           |

|                                                                                                                                                   |                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>FIRES</b> s.r.o.<br>POŽIARNA ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009<br><br>Podpis/Signature |
|                                                                                                                                                   | Dokument č.<br>Document No. <b>FIRES-FR-004-09-AWE</b>                                                                              |
| Príloha č./Appendix No. <b>42</b>                                                                                                                 |                                                                                                                                     |

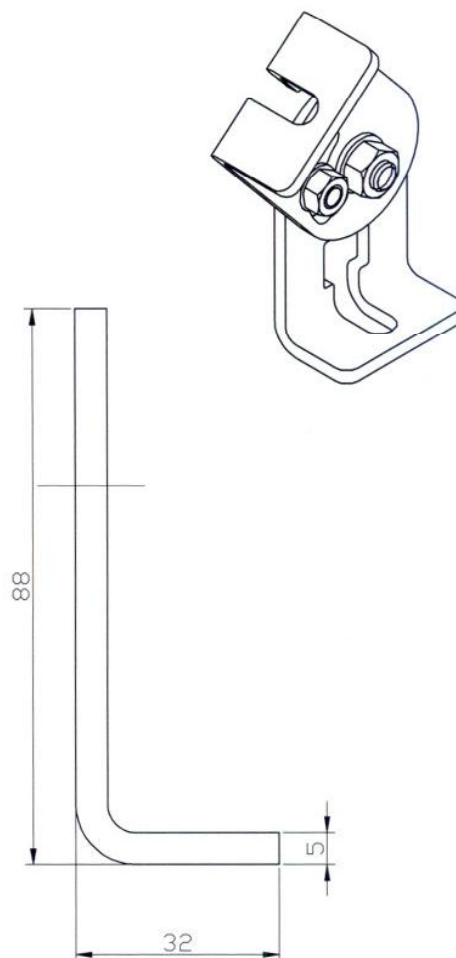
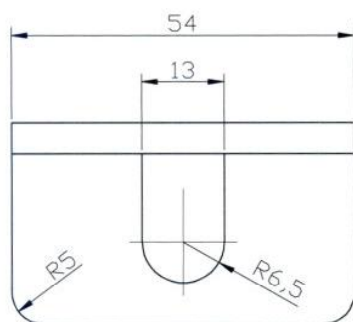
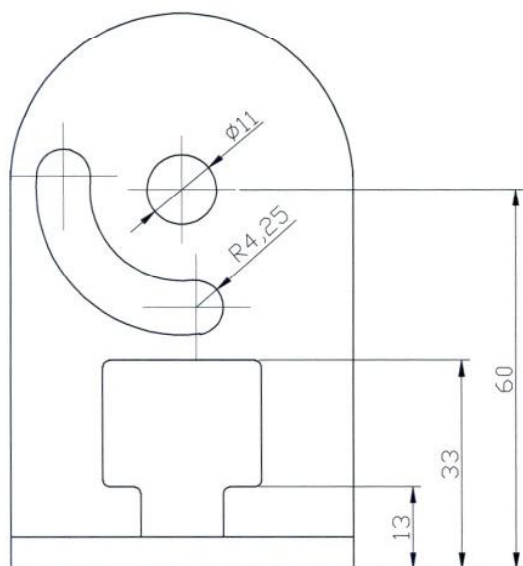


|                                                                                                                             |                                         |                                   |                                                           |                              |                                      |                                             |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------|-----------------------------------------------------------|------------------------------|--------------------------------------|---------------------------------------------|
|                                          | Odkchylka<br>wynarów<br>nietolerowanych |                                   | Materiał<br>Gatunek<br>Nr normy<br>półfabrykat (nr normy) | Masa (kg)<br>-----           | Podziałka<br>1:1                     | Format<br>A4<br>Arkusz<br>1<br>Arkuszy<br>1 |
|                                                                                                                             |                                         |                                   |                                                           |                              |                                      |                                             |
| Projektował                                                                                                                 | T. Grudniński                           | Podpis<br>_____<br>_____<br>_____ | 2004.12.29                                                | Nazwa rysunku<br>UKD1/38-40E |                                      |                                             |
| Rysował                                                                                                                     | J. Jasiński                             |                                   | 2004.12.29                                                |                              |                                      |                                             |
| Sprawił                                                                                                                     | J. Kliczek                              |                                   | 2004.12.29                                                |                              |                                      |                                             |
| Zatwierdził                                                                                                                 | J. Kliczek                              |                                   | 2004.12.29                                                |                              |                                      |                                             |
|                                                                                                                             |                                         |                                   | Nr programu maszynowego<br>---                            |                              | Nr zmiany<br>_____<br>_____<br>_____ |                                             |
|  Profesjonalne Systemy<br>Tras Kablowych |                                         |                                   |                                                           |                              |                                      |                                             |



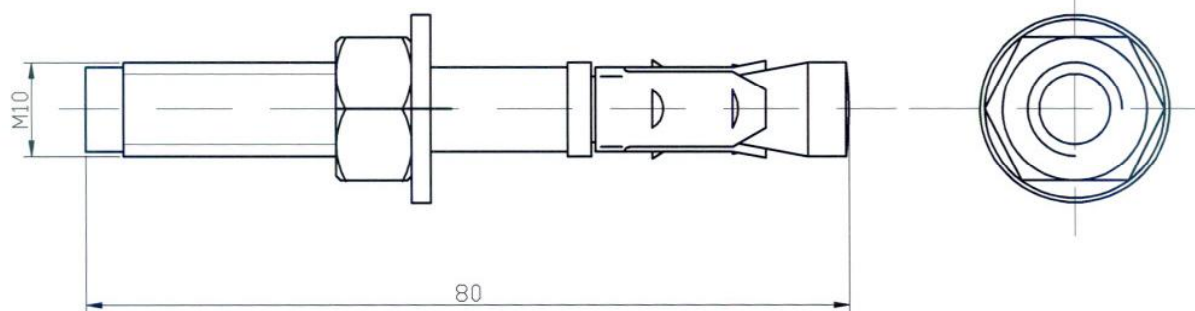
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|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|  <b>FIRES s.r.o.</b><br>POŽIARNÁ ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009<br><br>Podpis/Signature |
|                                                                                                                                                 | Dokument č.<br>Document No. <b>FIRES-FR-004-09-BWE</b>                                                                                |
| Príloha č./Appendix No. <b>43</b>                                                                                                               |                                                                                                                                       |

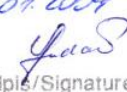
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|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------|----------------------|-----------------------------------|
|                                          | Uchytka<br>wymiarów<br>niez tolerowanych | Grubość [mm]<br><br>5                      | Materiał<br>Gatunek<br>Nr normy<br>półfabrykat (nr normy) | Blacha stal. cynk. met. zanurz.<br>PN-EN ISO 1461:2000<br><br>0,21 | Podziałka<br><br>1:1 | Format<br>A4<br>Arkusz<br>Arkuszy |
| Projektował                                                                                                                 | J.GROCHOWSKI                             | Podpis<br>_____<br>_____<br>_____<br>_____ | Data<br>20.10.05<br>20.10.05<br>20.10.05<br>20.10.05      | Nazwa rysunku<br><br>USDV                                          |                      | Nr zmlony                         |
| Rysował                                                                                                                     | J.Grochowski                             |                                            |                                                           |                                                                    |                      |                                   |
| Sprawdził                                                                                                                   | T.WŁODARCZYK                             |                                            |                                                           |                                                                    |                      |                                   |
| Zatwierdził                                                                                                                 | J.KLICZEK                                |                                            |                                                           |                                                                    |                      |                                   |
|  Profesjonalne Systemy<br>Tras Kablowych |                                          |                                            |                                                           | Nr rysunku<br><br>803700                                           |                      |                                   |



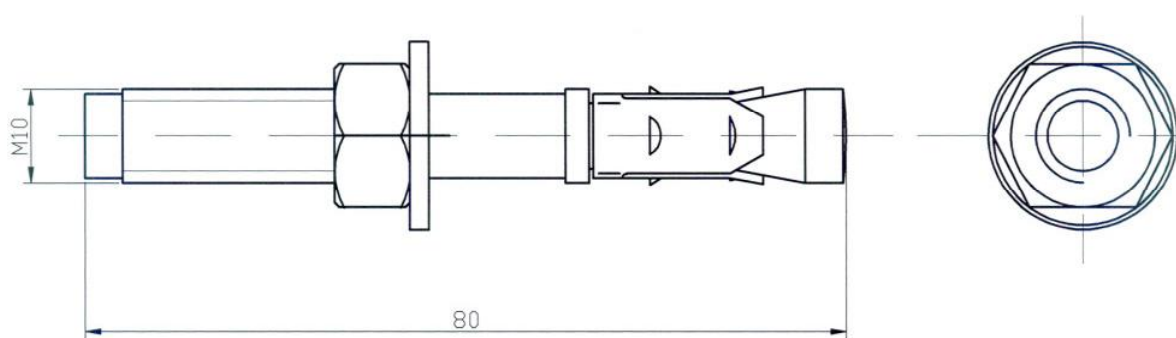
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| <br><b>FIRES</b> s.r.o.<br>POŽIARNA ODOLNOST<br>FIRE RESISTANCE | Dátum/Date<br><i>16.01.2009</i>        |
|                                                                                                                                                     | Podpis/Signature<br><i>J. Jasinski</i> |
| Dokument č. / Document No. <i>FIRES-FR-009-0A-ANNE</i>                                                                                              |                                        |
| Príloha č./Appendix No. <i>44</i>                                                                                                                   |                                        |

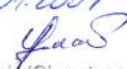
|                                                                                                                             |                                                                                |                                        |                  |                                                                                                                                                                                                      |                  |              |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|--|--|--|--|--|--|--|
|  Dřchytka<br>vyniarůw<br>nietolerowanych |                                                                                | Materiał<br><i>Blacha kwasoodporna</i> |                  | Masa [kg]<br>0,41                                                                                                                                                                                    | Podziałka<br>1:1 | Format<br>A4 |  |  |  |  |  |  |  |
| Projektował<br><i>T. GRUDNIEWSKI</i>                                                                                        | Nazwisko<br><i>J. JASIŃSKI</i><br><i>JACEK KLICZEK</i><br><i>JACEK KLICZEK</i> | Podpis<br>_____<br>_____<br>_____      | Data<br>29.12.04 | Nazwa rysunku<br><i>WPPDVE</i>                                                                                                                                                                       |                  |              |  |  |  |  |  |  |  |
| Rysował<br><i>J. JASIŃSKI</i>                                                                                               |                                                                                |                                        | Data<br>29.12.04 | WIESZAK PRZEGUBOWY PRĘTA                                                                                                                                                                             |                  |              |  |  |  |  |  |  |  |
| Sprawdził<br><i>JACEK KLICZEK</i>                                                                                           |                                                                                |                                        | Data<br>29.12.04 | Nr rysunku<br><i>803801</i>                                                                                                                                                                          |                  |              |  |  |  |  |  |  |  |
| Zatwierdził<br><i>JACEK KLICZEK</i>                                                                                         |                                                                                |                                        | Data<br>29.12.04 | Nr zmiany<br><table border="1" style="width: 100px; height: 40px;"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> |                  |              |  |  |  |  |  |  |  |
|                                                                                                                             |                                                                                |                                        |                  |                                                                                                                                                                                                      |                  |              |  |  |  |  |  |  |  |
|                                                                                                                             |                                                                                |                                        |                  |                                                                                                                                                                                                      |                  |              |  |  |  |  |  |  |  |
|                                                                                                                             |                                                                                |                                        |                  |                                                                                                                                                                                                      |                  |              |  |  |  |  |  |  |  |
|  Profesjonalne Systemy<br>Tras Kablowych |                                                                                |                                        |                  |                                                                                                                                                                                                      |                  |              |  |  |  |  |  |  |  |



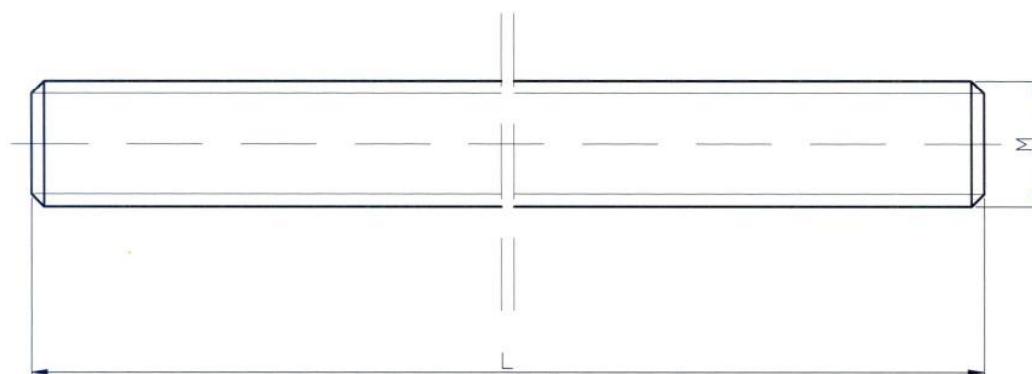
|                                                                                                                                                    |                                                                                                           |
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| <br><b>FIRES s.r.o.</b><br>POŽIARNÁ ODOLNOSŤ<br>FIRE RESISTANCE | Dátum/Date<br>16.01.2009                                                                                  |
|                                                                                                                                                    | Podpis/Signature<br> |
| Dokument č. / Document No. <b>FIRES-FR-004-03-AWWE</b>                                                                                             |                                                                                                           |
| Príloha č./Appendix No. <b>45</b>                                                                                                                  |                                                                                                           |

|                                                                                                                              |                                                                            |                        |                                                                    |                                    |                  |                                       |                        |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------|------------------------------------|------------------|---------------------------------------|------------------------|
|                                           | Odchytyka<br>wymiarów<br>niez tolerowanych                                 |                        | Materiał<br>Gatunek <i>Stal cynkowana galwanicznie</i><br>Nr normy | Masa [kg]                          | Podziałka<br>1:1 | Format <b>A4</b><br>Arkusz<br>Arkuszy |                        |
|                                                                                                                              |                                                                            |                        |                                                                    |                                    |                  |                                       | półfabrykat (nr normy) |
| Projektował<br><b>J.GROCHOWSKI</b>                                                                                           | Nazwisko<br><b>J.Grochowski</b><br><b>T.WŁODARCZYK</b><br><b>J.KLICZEK</b> | Podpis<br><br><br><br> | Data<br>20.10.05                                                   | Nazwa rysunku<br><b>PSROM10x80</b> |                  |                                       |                        |
| Rysował                                                                                                                      |                                                                            |                        | Data<br>20.10.05                                                   | Nr rysunku<br><b>804100</b>        |                  | Nr zmiany                             |                        |
| Sprawdził                                                                                                                    |                                                                            |                        | Data<br>20.10.05                                                   |                                    |                  |                                       |                        |
| Zatwierdził                                                                                                                  |                                                                            |                        | Data<br>20.10.05                                                   |                                    |                  |                                       |                        |
|  Profesjonalne Systemy<br>Tras. Kablowych |                                                                            |                        |                                                                    |                                    |                  |                                       |                        |



|                                                                                                                                                    |                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <br><b>FIRES s.r.o.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE | Datum/Date<br>16. 01. 2009                                                                                |
|                                                                                                                                                    | Podpis/Signature<br> |
| Dokument č. / Document No. <b>FIRES-FR-004-09-ANNE</b>                                                                                             |                                                                                                           |
| Příloha č./Appendix Nb. <b>46</b>                                                                                                                  |                                                                                                           |

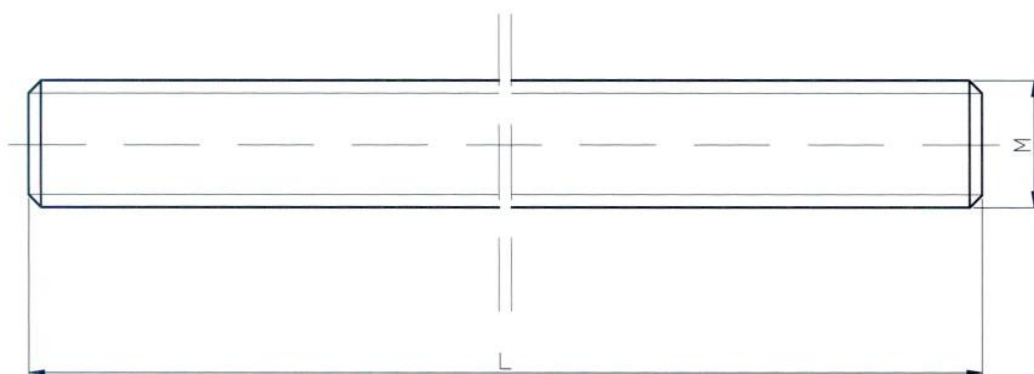
|                                                                                                                             |                                                       |        |                                 |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------|---------------------------------|-------------------------------------|-----------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
|                                          | Oddychka<br>wymiarów<br>nietolerowanych               |        | Materiał<br>Gatunek<br>Nr normy | Stal kwasoodporna w gat. A4         | Masa [kg] | Podziałka<br>1:1 | Format A4                                                                                                                                  |  |  |  |  |  |  |  |  |  |
|                                                                                                                             |                                                       |        |                                 | półfabrykat (nr normy)              |           |                  | Arkusz                                                                                                                                     |  |  |  |  |  |  |  |  |  |
| Projektował<br>J.GROCHOWSKI                                                                                                 | Nazwisko<br>J.Grochowski<br>T.WŁODARCZYK<br>J.KLICZEK | Podpis | Data<br>20.10.05                | Nazwa rysunku<br><b>PSROM10x80E</b> |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
| Rysował<br>J.Grochowski                                                                                                     |                                                       |        | 20.10.05                        | Nr rysunku<br><b>804101</b>         |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
| Sprawdził<br>T.WŁODARCZYK                                                                                                   |                                                       |        | 20.10.05                        |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
| Zatwierdził<br>J.KLICZEK                                                                                                    |                                                       |        | 20.10.05                        |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
|  Profesjonalne Systemy<br>Tras Kablowych |                                                       |        |                                 |                                     | Nr zmian  |                  | <table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> |  |  |  |  |  |  |  |  |  |
|                                                                                                                             |                                                       |        |                                 |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
|                                                                                                                             |                                                       |        |                                 |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |
|                                                                                                                             |                                                       |        |                                 |                                     |           |                  |                                                                                                                                            |  |  |  |  |  |  |  |  |  |



|  |                                                        |
|--|--------------------------------------------------------|
|  | Datum/Date<br>16.01.2009                               |
|  | Podpis/Signature<br><i>[Signature]</i>                 |
|  | Dokument č.<br>Document No. <i>FIRES-FR-004-07-AWE</i> |
|  | Príloha č./Appendix No. <i>44</i>                      |

|         |                 |                   |              |               |
|---------|-----------------|-------------------|--------------|---------------|
| PGM12/1 | 12              | 1000              | 0,72         | 651201        |
| PGM10/1 | 10              | 1000              | 0,49         | 651001        |
| PGM6/1  | 6               | 1000              | 0,16         | 650301        |
| Symbol  | Gwint<br>M (mm) | Długość<br>L (mm) | Masa<br>(kg) | Nr katalogowy |

|                             |                                                      |                   |                                         |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
|-----------------------------|------------------------------------------------------|-------------------|-----------------------------------------|-----------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------|--|--|--|--|--|--|--|--|--|
|                             | Odchyłka<br>wymiarów<br>nietolerowanych              | Grubość (mm)<br>- | Gatunek<br>Nr normy                     | Stal cynkowana galwanicznie | Masa (kg) | Podziałka<br>2:1                                                                                                                           | Format A4 |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   | Materiał                                | Nr rysunku                  |           |                                                                                                                                            | Arkusz    |  |  |  |  |  |  |  |  |  |
| Projektował<br>J.GROCHOWSKI | Nazwisko<br>J.Grochowski<br>T.WŁODARCZYK<br>JKLICZEK | Podpis            | Data<br>20.10.05                        | PG M... / 1                 |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
| Rysował                     |                                                      |                   | Data<br>20.10.05                        |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
| Sprawdził                   |                                                      |                   | Data<br>20.10.05                        |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
| Zatwierdził                 |                                                      |                   | Data<br>20.10.05                        |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   | Profesjonalne Systemy<br>Tras Kablowych |                             |           | Nr zbilansy                                                                                                                                |           |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   | Nr rysunku                              |                             |           | <table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> |           |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   |                                         |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   |                                         |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |
|                             |                                                      |                   |                                         |                             |           |                                                                                                                                            |           |  |  |  |  |  |  |  |  |  |



|                                                                                                                                                 |  |                                                                                                                                     |  |                                            |                 |                                                      |              |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------|-----------------|------------------------------------------------------|--------------|------------------|
|  <b>FIRES S.I.O.</b><br>POŻIARNA ODOLNOŚĆ<br>FIRE RESISTANCE |  | Datum/Date<br>16.01.2009<br>Podpis/Signature<br> |  | PGM10/1E                                   | 10              | 1000                                                 | 0,49         | 652101           |
| Dokument č.<br>Document No.                                                                                                                     |  | Príloha č./Appendix No.                                                                                                             |  | PGM6/1E                                    | 10              | 1000                                                 | 0,16         |                  |
| Dokument č.<br>Document No.                                                                                                                     |  | Príloha č./Appendix No.                                                                                                             |  | Symbol                                     | Gwint<br>M (mm) | Długość<br>L (mm)                                    | Masa<br>(kg) | Nr katalogowy    |
| Dokument č.<br>Document No.                                                                                                                     |  | Príloha č./Appendix No.                                                                                                             |  |                                            |                 |                                                      |              |                  |
|  Odchyłka<br>wymiarów<br>niez tolerowanych                   |  | Grubość [mm]<br>-                                                                                                                   |  | Gatunek<br>Nr normy                        |                 | Stal kwasoodporna w gat.A4                           |              | Masa [kg]        |
| Projektował<br>Rysował<br>Sprawdził<br>Zatwierdził                                                                                              |  | Nazwisko<br>J.GROCHOWSKI<br>J.Grochowski<br>T.WŁODARCZYK<br>J.KLICZEK                                                               |  | Podpis<br>_____<br>_____<br>_____<br>_____ |                 | Data<br>20.10.05<br>20.10.05<br>20.10.05<br>20.10.05 |              | Podziałka<br>2:1 |
| Format<br>A4                                                                                                                                    |  | Arkusz<br>_____<br>_____                                                                                                            |  | Nazwa rysunku<br>PGM..../1E                |                 |                                                      |              |                  |
| Nr rysunku                                                                                                                                      |  | Nr zmiany                                                                                                                           |  |                                            |                 |                                                      |              |                  |
|  Profesjonalne Systemy<br>Tras Kablowych                     |  |                                                                                                                                     |  |                                            |                 |                                                      |              |                  |