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FIRES
The Experts on Fire Safety

SNAS
Reg. No. 041/S-159

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

TEST REPORT

Test report number: **FIRES-FR-094-09-AUNE**
Tested property: Function in fire
Test method: DIN 4102 – 12:1998-11

Date of issue: **17. 07. 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 cables

Sponsor: **BAKS Kazimierz Sielski,** ul. Jagodne 5, 05-480 Karczew, Poland
TECHNOKABEL S.A., Nasielska 55, 04-343 Warszawa, Poland

Task No.: PR-09-0052
Specimen received: 22. 06. 2009
Date of the fire test: 25. 06. 2009
Technician responsible for the technical side of this report: Miroslav Hudák

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Number of pages:	8	Number of appendices:	68
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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. Stradomski (TECHNOKABEL)

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

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Fires s.r.o. Batizovce is full member of EGOLF also, more information www.egolf.org.uk.

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 TECOMAT NS 950	-
F 40 008	Software Control Web 2000	
F 40 009	Control and communication software to PLC TECOMAT NS 950	
F 40 010	Visual and calculating software to PLC 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 52 4 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 ϕ 3 mm	ambient temperature
F 69 009	PLC system for data acquisition and climate control 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, UKO1, UKO2, OZO and power and communication non-halogen cables business TECHNOKABEL S. A..

Cables:	(N)HXH 4x1,5 RE FE180 PH30/E30	(4 x)
	(N)HXH 4x50 RM FE180 PH30/E30	(4 x)
	(N)HXCH 4x1,5/1,5 RE FE180 PH30/E30	(4 x)
	(N)HXCH 4x50/25 RM FE180 PH30/E30	(4 x)
	(N)HXH 4x1,5 RE FE180 PH90/E90	(18 x)
	(N)HXH 4x50 RM FE180 PH90/E90	(16 x)
	(N)HXH 4x1,5 RE FE180 PH90/E90 (1)	(6 x)
	(N)HXH 4x50 RM FE180 PH90/E90 (1)	(6 x)
	(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	(6 x)
	(N)HXCH 4x50/25 RM FE180 PH90/E90	(4 x)
	HDGszo 3x1,5 RE FE180 PH90/E30-E90	(10 x)
	HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	(8 x)
	HLGs 2x1,0 FE180 PH90/E30-E90	(12 x)
	HLGsekw 2x1,0 FE180 PH90/E30-E90	(6 x)
	HTKSH 1x2x0,8 FE180 PH90/E30-E90	(2 x)
	HTKSHekw 1x2x0,8 FE180 PH90/E30-E90	(2 x)

Supporting system BAKS: wall and ceiling installation and four suspension tracks was used for specimen test.
Wall installation: was made by cable clips (type UDF) which were fixed to wall (aerated concrete Ytong) by nails (length minimum 75 mm) in spacing of 600 mm.
Ceiling installation: was made by cable clips (type UEF) which were fixed to ceiling by dowels (type GSO M6x40 and KWBO M6x40) in spacing of 600 mm, cable clips (type OZO) which were fixed to ceiling by dowels (type SRO M6x30) in spacing of 600 mm and ceiling ledges (type SDOC 500) which were fixed to ceiling by dowels (type SRO M6x30) in spacing of 600 mm. Cables were fixed to ledges by clips (type UKO1 and UKO2) in spacing of 600 mm. Cable clips were depending on the diameter of cables.
Suspension track No. 1: was made by three hangers (type WPCO 800) which were fixed to ceiling by two dowels (type PSRn M10x85, producer DROMET) in spacing of 1200 mm. Two booms (type WWSO 400) were fixed by screws (type SM M8x30) at each hanger. Holders (type UPWO) were fixed at the end of booms. Booms were fixed through these holders by threaded bar (type PGM10/1x800) with washers and nuts M10 to ceiling holder (type USO12) which was fixed to ceiling by dowel (type PSRn M10x85, producer DROMET).
Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at upper horizontal supports and jointed together by four junctions (type LLP400H60), two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Trays were fixed to supports by screws M6 (type SGN M6x12).

Ladders (type DUOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at under booms and jointed together by two junctions (type LPDZP 400H60), two junctions (type LPDWP 400H60) and two junctions (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. 2: was made of three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x800) with washers and nuts M10 which were fixed to ceiling holder (type USO12) which was fixed to ceiling by dowel (type PSRn M10x85, producer DROMET) in spacing of 1200 mm.

Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at upper horizontal supports and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Trays were fixed to supports by screws M6 (type SGN M6x12).

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at under horizontal supports and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to supports 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. 3: was made of three consoles combined of three horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x800) with washers and nuts M10 which were fixed to ceiling holder (type USO12) which was fixed to ceiling by dowel (type PSRn M10x85, producer DROMET) in spacing of 1200 mm.

Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at upper and under horizontal supports and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Trays were fixed to supports by screws M6 (type SGN M6x12).

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at central horizontal supports and jointed together by two junctions (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to supports 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. 4: was made of three consoles combined of three horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x800) with washers and nuts M10 which were fixed to ceiling holder (type USO12) which was fixed to ceiling by dowel (type PSRn M10x85, producer DROMET) in spacing of 1200 mm.

Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at under horizontal supports and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Trays were fixed to supports by screws M6 (type SGN M6x12).

Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at upper and central horizontal supports and jointed together by two junctions (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to supports by clips (type ZMO) with screws M8 (type SGN M8x14).

Cables were fixed to trays by clips UDF and ladders by clips UKO1.

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
50,0	2,2	24,4	0,2

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_2 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]**
25. 06. 2009	72,3	18,7

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
Specimens 1, 2: cables (N)HXCH 4x50/25 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimens 3, 4: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimens 5, 6: cables (N)HXH 4x50 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimens 7, 8: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 9: cable (N)HXH 4x50 RM FE180 PH90/E90	**27 minutes**
Specimen 10: cable (N)HXH 4x50 RM FE180 PH90/E90	**26 minutes**
Specimen 11: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**25 minutes**
Specimen 12: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**26 minutes**
Specimen 13: cable (N)HXH 4x50 RM FE180 PH90/E90	**46 minutes**
Specimen 14: cable (N)HXH 4x50 RM FE180 PH90/E90	**43 minutes**
Specimen 15: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**49 minutes**
Specimen 16: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**70 minutes**
Specimen 17: cables (N)HXH 4x50 RM FE180 PH90/E90	**51 minutes**
Specimen 18: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 19: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 20: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	**51 minutes**
Specimen 21: cables (N)HXH 4x50 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 22: cables (N)HXCH 4x50/25 RM FE180 PH90/E90	**28 minutes**
Specimen 23: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimen 24: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimen 25: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 26: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 27: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimen 28: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimen 29: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 30: cables (N)HXH 4x50 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimens 31, 32: cables (N)HXCH 4x50/25 RM FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 33: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30	**90 minutes no failure/interruption**
Specimens 34, 35: cables (N)HXH 4x50 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 36: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**31 minutes**
Specimen 37: cable (N)HXH 4x1,5 RE FE180 PH90/E90	**30 minutes**
Specimens 38, 39: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimens 40, 41: cables (N)HXH 4x50 RM FE180 PH90/E90	**90 minutes no failure/interruption**
Specimens 42, 43: cables (N)HXH 4x1,5 RE FE180 PH90/E90	**90 minutes no failure/interruption**
Specimen 44: cable (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	**90 minutes no failure/interruption**
Specimen 45: cable (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	**47 minutes**
Specimen 46: cables (N)HXH 4x50 RM FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 47: cables (N)HXH 4x1,5 RE FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 48: cables (N)HXH 4x50 RM FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 49: cables (N)HXH 4x1,5 RE FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 50: cables (N)HXCH 4x50/25 RM FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 51: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30	**90 minutes no failure/interruption**
Specimen 52A: cable HLGsekw 2x1,0 FE180 PH90/E30-E90	**42 minutes**
Specimen 52B: cable HLGsekw 2x1,0 FE180 PH90/E30-E90	**52 minutes**
Specimen 53A: cable HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	**38 minutes**
Specimen 53B: cable HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	**37 minutes**
Specimens 54A, 54B: cables HDGsżo 3x1,5 RE FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 55A, 55B: cables HLGs 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 56A, 56B: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimen 57A: cable HDGsżo 3x1,5 RE FE180 PH90/E30-E90	**27 minutes**
Specimen 57B: cable HDGsżo 3x1,5 RE FE180 PH90/E30-E90	**33 minutes**
Specimen 58A: cable HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	**35 minutes**
Specimen 58B: cable HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	**20 minutes**
Specimen 59A: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90	**55 minutes**
Specimen 59B: cable HTKSHekw 1x2x0,8 FE180 PH90/E30-E90	**43 minutes**

SPECIMENS	Time to first failure/interruption of conductor
Specimen 60A: cable HDGsžo 3x1,5 RE FE180 PH90/E30-E90	**56 minutes**
Specimen 60B: cable HDGsžo 3x1,5 RE FE180 PH90/E30-E90	**56 minutes**
Specimen 61A: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90	**62 minutes**
Specimen 61B: cable HTKSH 1x2x0,8 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 62A, 62B: cables HDGsžo 3x1,5 RE FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimen 63A: cable HDGsekwžo 3x2,5 RE FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimen 63B: cable HDGsekwžo 3x2,5 RE FE180 PH90/E30-E90	**48 minutes**
Specimens 64A, 64B: cables HLGs 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 65A, 65B: cables HLGsekw 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimen 66A: cable HLGsekw 2x1,0 FE180 PH90/E30-E90	**73 minutes**
Specimen 66B: cable HLGsekw 2x1,0 FE180 PH90/E30-E90	**50 minutes**
Specimens 67A, 67B: cables HDGsžo 3x1,5 RE FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimen 68A: cable HLGs 2x1,0 FE180 PH90/E30-E90	**66 minutes**
Specimen 68B: cable HLGs 2x1,0 FE180 PH90/E30-E90	**64 minutes**
Specimens 69A, 69B: cables HLGs 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 70A, 70B: cables HLGs 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**
Specimens 71A, 71B: cables HLGs 2x1,0 FE180 PH90/E30-E90	**90 minutes no failure/interruption**

The fire test was discontinued in 93rd 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 – S71 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: **Responsible for the technical side of this report:**

Ing. Štefan Rástocký
leader of the testing laboratory

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 6	Measured times of tested specimens from S25 to S33
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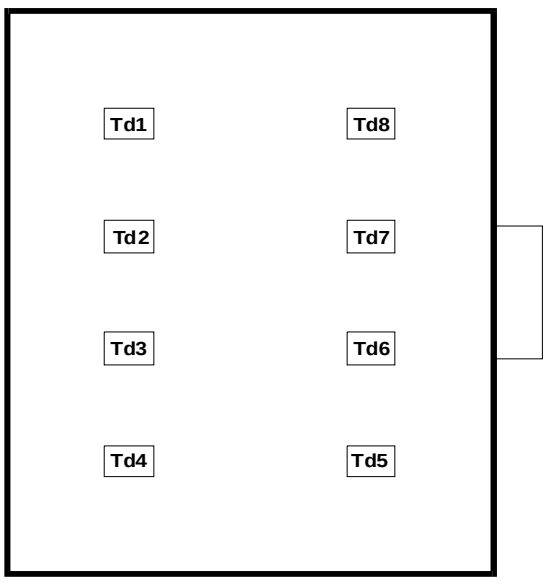
Measured values inside the test furnace

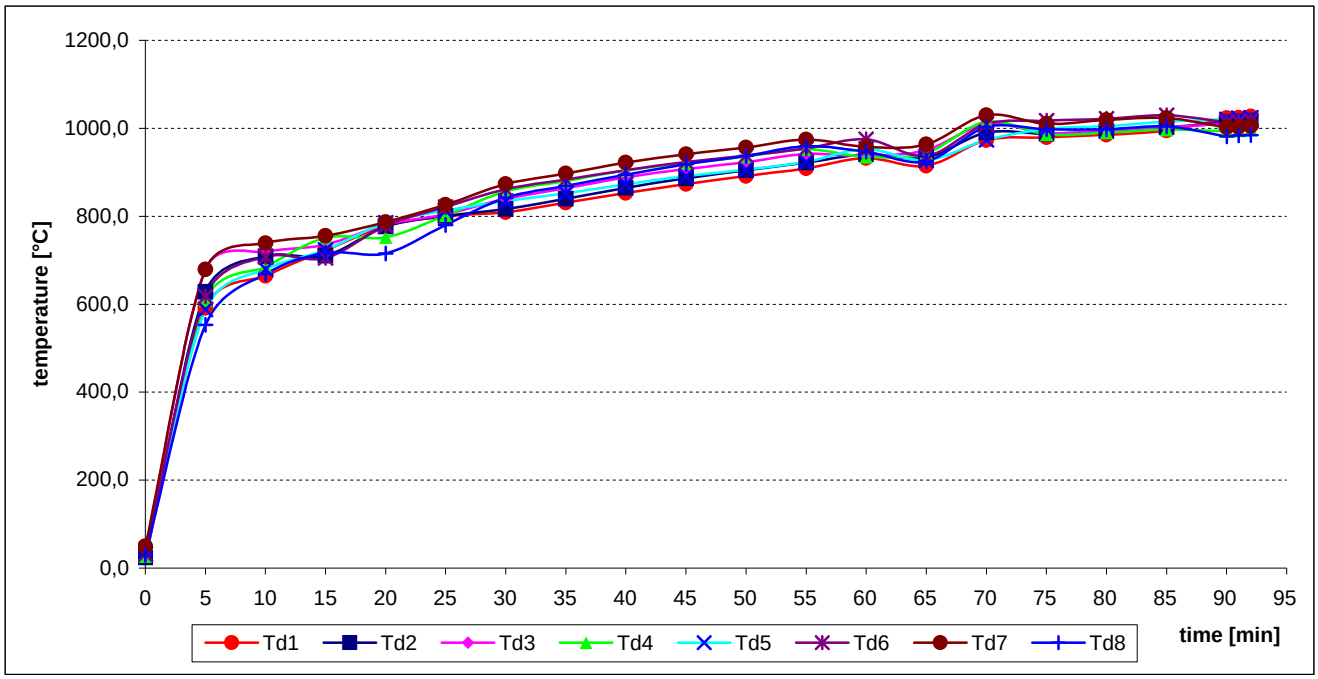
Time t [min]	Temperature [°C]											Deviation d_e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	23,4	23,8	40,5	27,1	31,5	31,9	49,4	29,9	32,2	20,0	15,9	0,0	-0,1
5	591,4	628,3	679,5	608,9	587,9	617,9	679,1	553,2	618,3	576,2	15,0	-11,4	9,4
10	664,2	708,9	719,1	684,9	680,0	707,2	738,6	668,5	696,4	678,4	12,9	-3,0	7,4
15	722,8	709,9	735,6	750,9	723,2	704,8	755,7	717,0	727,5	738,5	11,9	-2,4	10,5
20	777,7	776,6	780,7	752,4	784,9	778,5	786,6	715,3	769,1	781,3	11,5	-2,4	15,1
25	799,4	800,3	804,5	801,8	812,7	821,2	826,1	780,1	805,8	814,6	11,6	-1,7	10,9
30	809,2	816,4	840,1	856,4	834,9	861,7	873,0	842,0	841,7	841,8	11,3	-1,4	9,6
35	830,9	840,1	863,5	879,9	851,8	883,5	897,4	868,6	864,5	864,8	11,6	-1,2	11,5
40	853,2	864,6	888,3	904,4	872,8	904,5	921,7	894,5	888,0	884,7	11,3	-1,0	13,4
45	873,6	886,6	907,7	920,3	891,2	923,5	940,6	918,3	907,7	902,3	11,1	-0,8	10,5
50	891,4	904,3	923,0	935,8	906,0	938,0	956,3	937,4	924,0	918,1	11,2	-0,6	12,5
55	909,0	921,8	941,3	952,8	923,2	954,2	974,6	959,2	942,0	932,3	11,2	-0,4	10,0
60	932,2	940,8	937,4	934,8	952,6	974,8	957,9	947,1	947,2	945,3	11,2	-0,3	12,1
65	915,0	933,3	950,4	943,7	926,8	937,1	963,3	925,2	936,9	957,3	11,3	-0,9	11,2
70	973,1	990,4	1010,0	1015,0	973,6	1009,0	1030,0	1003,0	1000,5	968,4	10,9	-0,7	11,5
75	979,4	987,8	989,3	985,7	998,6	1017,0	1010,0	997,5	995,7	978,7	11,0	-0,4	10,2
80	985,4	993,5	995,5	990,3	1005,0	1022,0	1019,0	997,7	1001,1	988,4	11,1	-0,3	10,1
85	994,8	1002,0	1003,0	997,1	1015,0	1030,0	1023,0	1004,0	1008,6	997,4	11,1	-0,2	10,6
90	1023,0	1014,0	1010,0	993,2	1020,0	1014,0	1002,0	981,8	1007,3	1005,9	10,9	-0,2	11,6
91	1024,0	1015,0	1012,0	994,5	1023,0	1015,0	1003,0	983,7	1008,8	1007,6	11,0	-0,2	11,0
92	1027,0	1017,0	1015,0	996,8	1024,0	1017,0	1005,0	984,4	1010,8	1009,2	11,1	-0,2	11,3

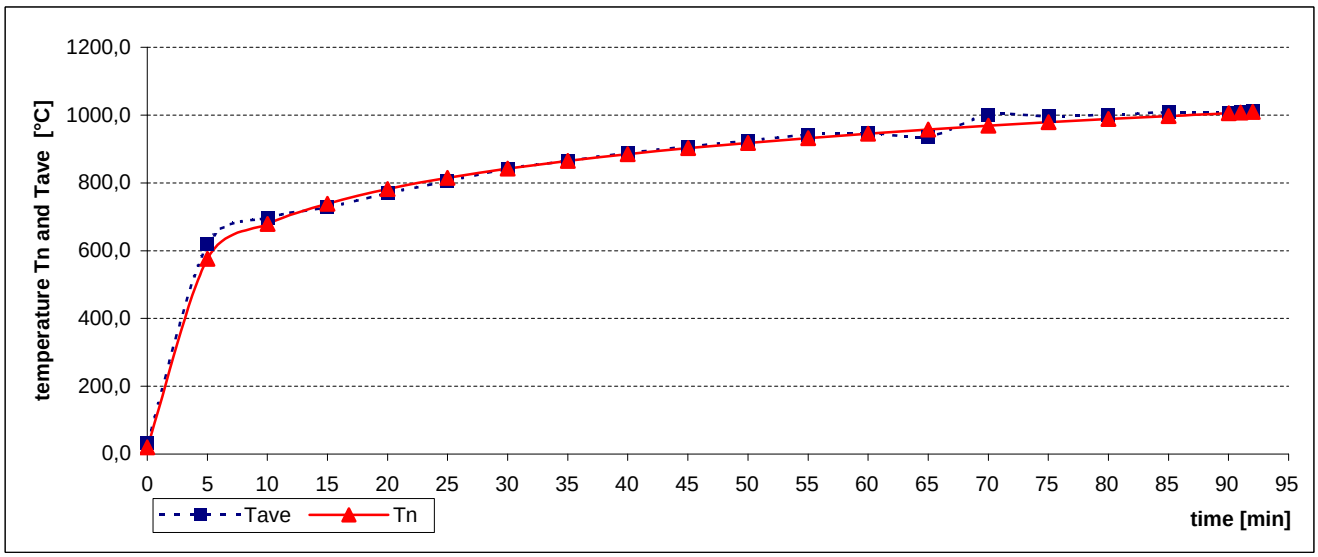
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside the test furnace measured under the ceiling of the test furnace

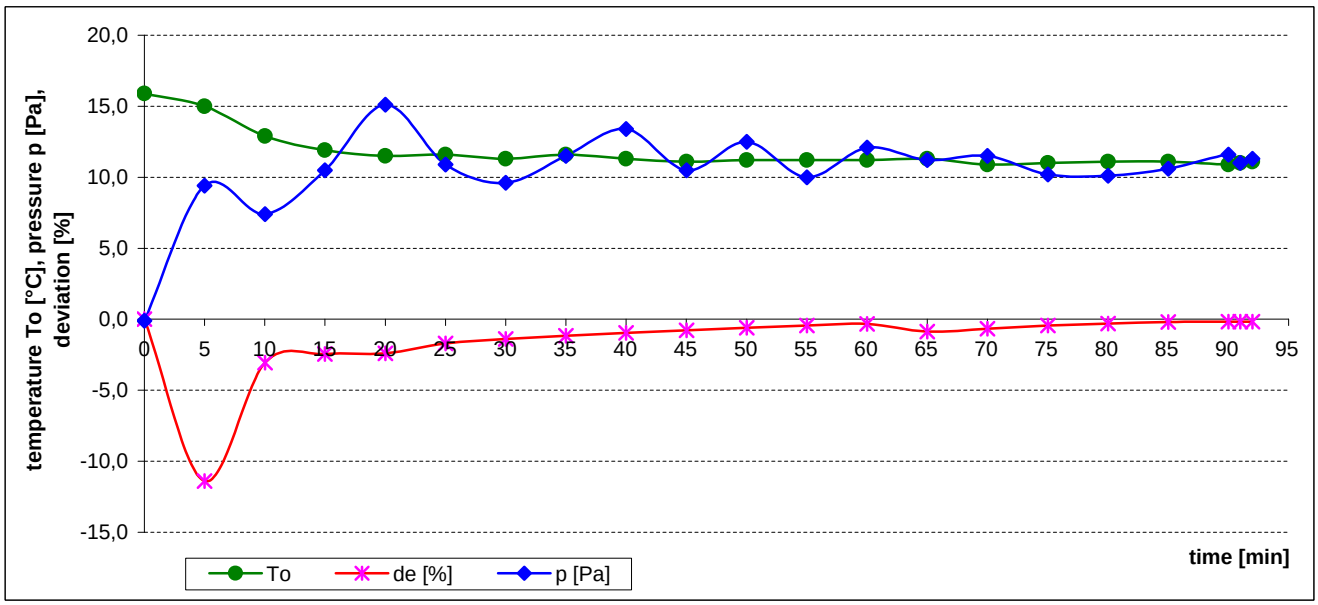
Layout of measuring points in the test furnace:



Measured values inside the test furnace / graph







Measured time of tested specimens from S1 to S8

Specimen	Bulbs	Time to permanent failure / interruption [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

Specimens 1, 2: cables (N)HXCH 4x50/25 RM FE180 PH90/E90
Specimens 3, 4: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimens 5, 6: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimens 7, 8: cables (N)HXH 4x1,5 RE FE180 PH90/E90

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	x
	34-L2	x
	35-L3	27:17
	36-PEN	x
S10	37-L1	x
	38-L2	x
	39-L3	26:41
	40-PEN	x
S11	41-L1	x
	42-L2	x
	43-L3	25:11
	44-PEN	x
S12	45-L1	x
	46-L2	x
	47-L3	26:41
	48-PEN	x
S13	49-L1	x
	50-L2	x
	51-L3	46:04
	52-PEN	x
S14	53-L1	x
	54-L2	x
	55-L3	43:48
	56-PEN	x
S15	57-L1	x
	58-L2	49:04
	59-L3	49:04
	60-PEN	x
S16	61-L1	x
	62-L2	x
	63-L3	70:05
	64-PEN	x

Specimens 9, 10: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimens 11, 12: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimens 13, 14: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimens 15, 16: cables (N)HXH 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 S17 to S24

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S17	65-L1	x
	66-L2	x
	67-L3	51:35
	68-PEN	x
S18	69-L1	no failure / interruption
	70-L2	no failure / interruption
	71-L3	no failure / interruption
	72-PEN	no failure / interruption
S19	73-L1	no failure / interruption
	74-L2	no failure / interruption
	75-L3	no failure / interruption
	76-PEN	no failure / interruption
S20	77-L1	x
	78-L2	x
	79-L3	51:35
	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	x
	86-L2	x
	87-L3	28:12
	88-PEN	x
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	no failure / interruption
	94-L2	no failure / interruption
	95-L3	no failure / interruption
	96-PEN	no failure / interruption

Specimen 17: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimen 18: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimen 19: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimen 20: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 21: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimen 22: cables (N)HXCH 4x50/25 RM FE180 PH90/E90
Specimen 23: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)
Specimen 24: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)

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-	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: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 26: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimen 27: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)
Specimen 28: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)
Specimen 29: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimen 30: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimens 31, 32: cables (N)HXCH 4x50/25 RM FE180 PH30/E30
Specimen 33: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30

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 [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	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	x
	142-L2	x
	143-L3	31:30
	144-PEN	x
S37	145-L1	x
	146-L2	30:48
	147-L3	x
	148-PEN	x
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
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

Specimens 34, 35: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimens 36, 37: cables (N)HXH 4x1,5 RE FE180 PH90/E90
Specimens 38, 39: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)
Specimens 40, 41: cables (N)HXH 4x50 RM FE180 PH90/E90
Specimen 42: cable (N)HXH 4x1,5 RE FE180 PH90/E90

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 S51

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	47:24
	178-L2	x
	179-L3	47:24
	180-PEN	x
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	no failure / interruption
	190-L2	no failure / interruption
	191-L3	no failure / interruption
	192-PEN	no failure / interruption
S49	193-L1	no failure / interruption
	194-L2	no failure / interruption
	195-L3	no failure / interruption
	196-PEN	no failure / interruption
S50	197-L1	no failure / interruption
	198-L2	no failure / interruption
	199-L3	no failure / interruption
	200-PEN	no failure / interruption
S51	201L1	no failure / interruption
	202-L2	no failure / interruption
	2039-L3	no failure / interruption
	204-PEN	no failure / interruption

Specimen 43: cable (N)HXH 4x1,5 RE FE180 PH90/E90
Specimens 44, 45: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)
Specimen 46: cables (N)HXH 4x50 RM FE180 PH30/E30
Specimen 47: cables (N)HXH 4x1,5 RE FE180 PH30/E30
Specimen 48: cables (N)HXH 4x50 RM FE180 PH30/E30
Specimen 49: cables (N)HXH 4x1,5 RE FE180 PH30/E30
Specimen 50: cables (N)HXCH 4x50/25 RM FE180 PH30/E30
Specimen 51: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30

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	42:15
	210-PEN	x
S52B	211-L	52:35
	212-PEN	x
S53A	213-L	38:54
	214-PEN	x
S53B	215-L	37:38
	216-PEN	x
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	27:33
	230-PEN	x
S57B	231-L	33:15
	232-PEN	x
S58A	233-L	35:04
	234-PEN	x
S58B	235-L	20:41
	236-PEN	x
S59A	237-L	55:53
	238-PEN	x
S59B	239-L	43:51
	240-PEN	x

Specimens 52: cables HLGsekw 2x1,0 FE180 PH90/E30-E90
Specimens 53: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90
Specimens 54: cables HDGsżo 3x1,5 RE FE180 PH90/E30-E90
Specimens 55: cables HLGs 2x1,0 FE180 PH90/E30-E90
Specimens 56: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90
Specimens 57: cables HDGsżo 3x1,5 RE FE180 PH90/E30-E90
Specimens 58: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90
Specimens 59: 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 diods 3V / 0,03W. 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	56:53
	242-PEN	x
S60B	243-L	56:28
	244-PEN	x
S61A	245-L	62:25
	246-PEN	x
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	48:56
	256-PEN	x
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	73:24
	266-PEN	x
S66B	267-L	50:02
	268-PEN	x
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 HDGszo 3x1,5 RE FE180 PH90/E30-E90
Specimens 61: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90
Specimens 62: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90
Specimens 63: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90
Specimens 64: cables HLGs 2x1,0 FE180 PH90/E30-E90
Specimens 65: cables HLGsekw 2x1,0 FE180 PH90/E30-E90
Specimens 66: cables HLGsekw 2x1,0 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.

Measured time of tested specimens from S68 to S71

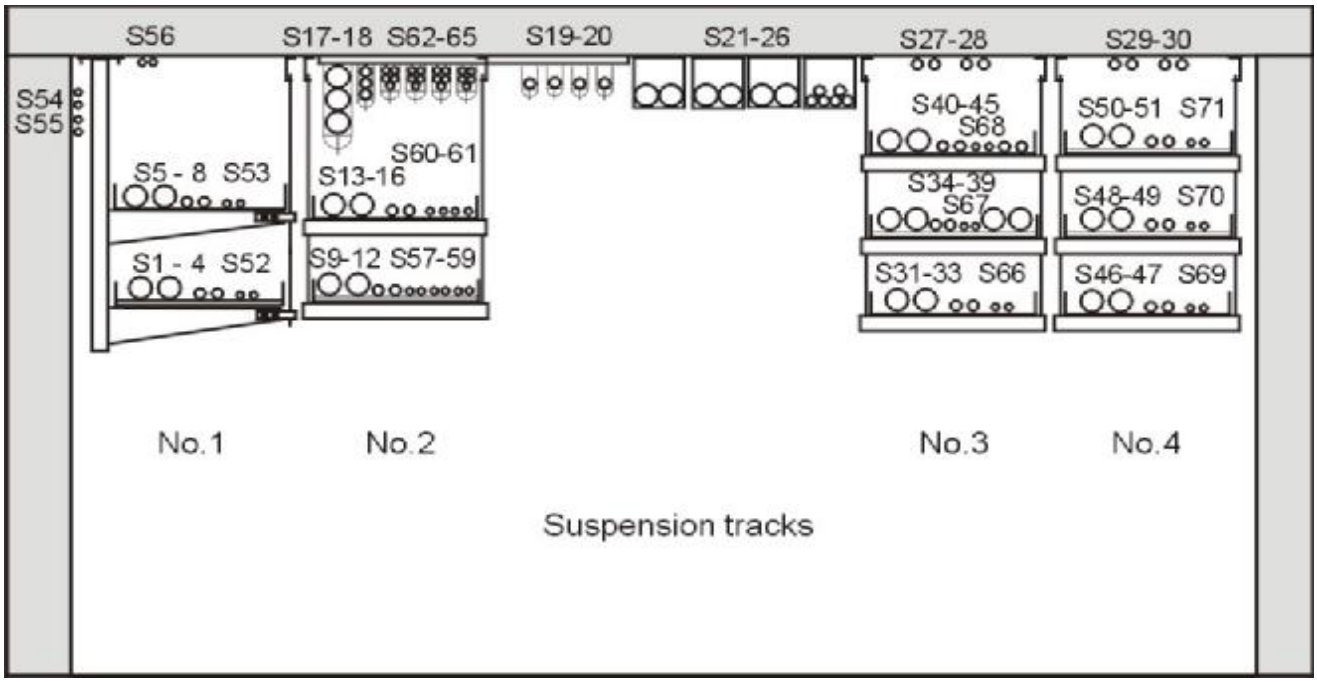
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S68A	273-L	x
	274-PEN	66:37
S68B	275-L	x
	276-PEN	64:24
S69A	277-L	no failure / interruption
	278-PEN	no failure / interruption
S69B	279-L	no failure / interruption
	280-PEN	no failure / interruption
S70A	281-L	no failure / interruption
	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	no failure / interruption
	288-PEN	no failure / interruption

Specimens 67: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90
Specimens 68: cables HLGs 2x1,0 FE180 PH90/E30-E90
Specimens 69: cables HLGs 2x1,0 FE180 PH90/E30-E90
Specimens 70: cables HLGs 2x1,0 FE180 PH90/E30-E90
Specimens 71: cables HLGs 2x1,0 FE180 PH90/E30-E90

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

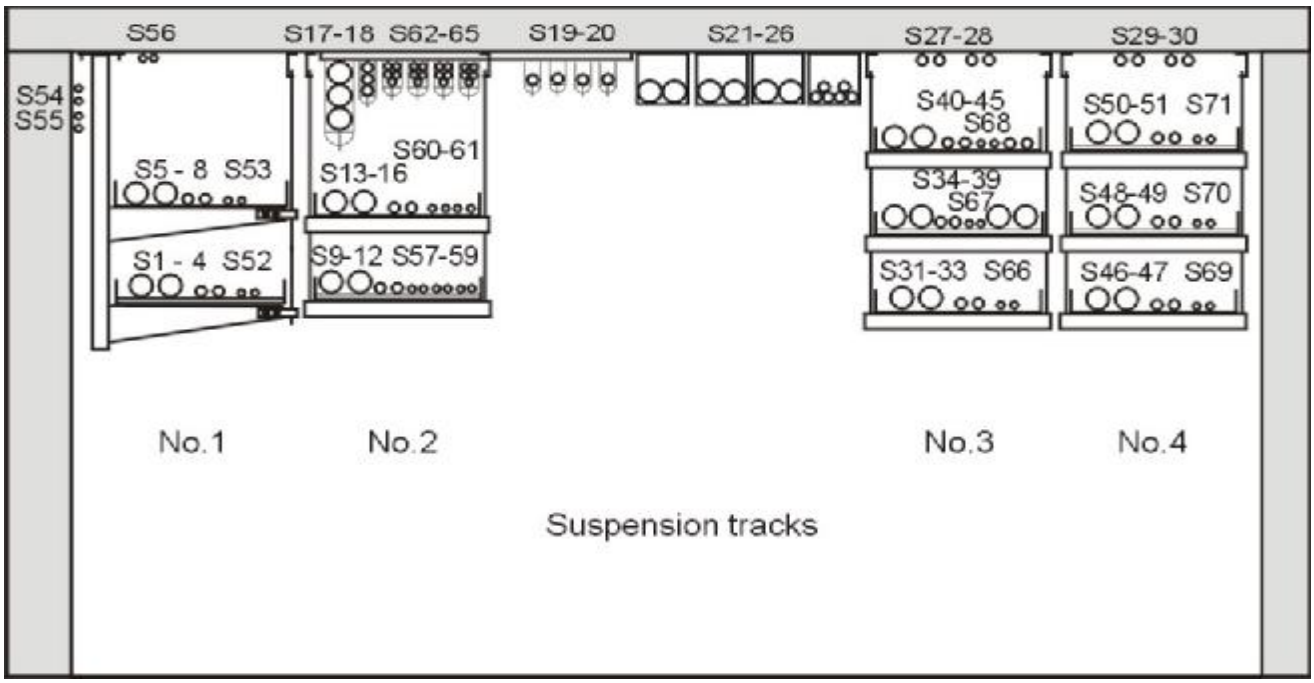
Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,03W. Circuit breakers with rating 3 A were used.

Layout of cables in the test furnace



Specimens 1, 2: cables (N)HXCH 4x50/25 RM FE180 PH90/E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.1
Specimens 3, 4: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimens 5, 6: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.1
Specimens 7, 8: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimens 9, 10: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.2
Specimens 11, 12: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimens 13, 14: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.2
Specimens 15, 16: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimen 17: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed in ceiling profile ledges SDOC 500 with clips UKO2 (BAKS) in spacing of 600 mm.
Specimen 18: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimen 19: cables (N)HXH 4x1,5 RE FE180 PH90/E90	Specimens placed in ceiling profile ledges SDOC 500 with clips UKO1 (BAKS) in spacing of 600 mm.
Specimen 20: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimen 21: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed in ceiling clips OZO (BAKS) in spacing of 600 mm.
Specimen 22: cables (N)HXCH 4x50/25 RM FE180 PH90/E90	
Specimen 23: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	
Specimen 24: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	
Specimen 25: cables (N)HXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimen 26: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimen 27: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	Specimens placed in ceiling clips UEF (BAKS) in spacing of 600 mm.
Specimen 28: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	
Specimen 29: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimen 30: cables (N)HXH 4x50 RM FE180 PH90/E90	
Specimens 31, 32: cables (N)HXCH 4x50/25 RM FE180 PH30/E30	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.3
Specimen 33: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30	
Specimens 34, 35: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3
Specimens 36, 37: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimens 38, 39: cables (N)HXH 4x50 RM FE180 PH90/E90 (1)	
Specimens 40, 41: cables (N)HXH 4x50 RM FE180 PH90/E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.3
Specimens 42, 43: cables (N)HXH 4x1,5 RE FE180 PH90/E90	
Specimens 44, 45: cables (N)HXH 4x1,5 RE FE180 PH90/E90 (1)	
Specimen 46: cables (N)HXH 4x50 RM FE180 PH30/E30	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.4
Specimen 47: cables (N)HXH 4x1,5 RE FE180 PH30/E30	
Specimen 48: cables (N)HXH 4x50 RM FE180 PH30/E30	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.4
Specimen 49: cables (N)HXH 4x1,5 RE FE180 PH30/E30	
Specimen 50: cables (N)HXCH 4x50/25 RM FE180 PH30/E30	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.4
Specimen 51: cables (N)HXCH 4x1,5/1,5 RE FE180 PH30/E30	

Layout of cables in the test furnace



Specimens 52: cables HLGsekw 2x1,0 FE180 PH90/E30-E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.1
Specimens 53: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.1
Specimens 54: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90	Specimens placed on the wall in clips UDF (BAKS) in spacing of 600 mm.
Specimens 55: cables HLGs 2x1,0 FE180 PH90/E30-E90	
Specimens 56: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	Specimens placed in ceiling clips UEF (BAKS) in spacing of 600 mm.
Specimens 57: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.2
Specimens 58: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	
Specimens 59: cables HTKSHekw 1x2x0,8 FE180 PH90/E30-E90	
Specimens 60: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.2
Specimens 61: cables HTKSH 1x2x0,8 FE180 PH90/E30-E90	
Specimens 62: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90	Specimens placed in ceiling profile ledges SDOC 500 with clips UKO1 (BAKS) in spacing of 600 mm.
Specimens 63: cables HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90	
Specimens 64: cables HLGs 2x1,0 FE180 PH90/E30-E90	
Specimens 65: cables HLGsekw 2x1,0 FE180 PH90/E30-E90	
Specimens 66: cables HLGsekw 2x1,0 FE180 PH90/E30-E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.3
Specimens 68: cables HLGs 2x1,0 FE180 PH90/E30-E90	
Specimens 67: cables HDGszo 3x1,5 RE FE180 PH90/E30-E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3
Specimens 69: cables HLGs 2x1,0 FE180 PH90/E30-E90	Specimens placed in the trays KCOP 400H60/3N (BAKS). Suspension track No.4
Specimens 70: cables HLGs 2x1,0 FE180 PH90/E30-E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.4
Specimens 71: cables HLGs 2x1,0 FE180 PH90/E30-E90	

Photos taken before the test

Photos taken after the termination of the test

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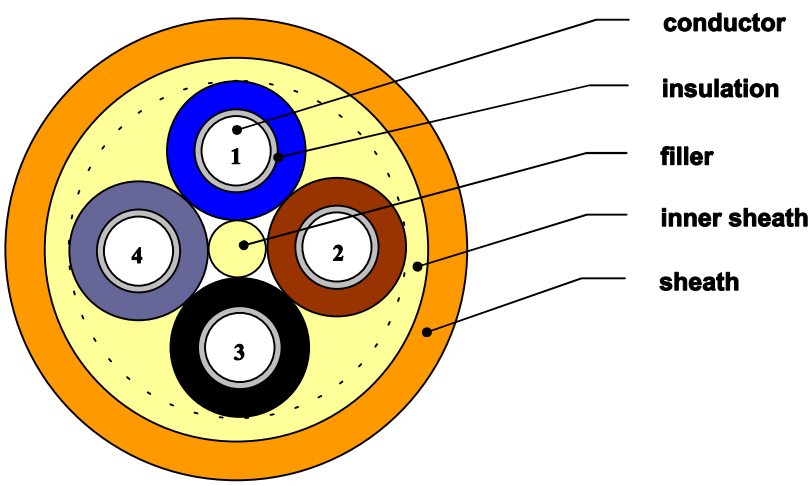
(N)HXH FE180 PH30/E30 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXH 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 suitable for indoor and outdoor installations.

CONSTRUCTION

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

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(N)HXH 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^2
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
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E30	DIN 4102-12
PH30	PN-EN 50200 or PN-EN 50362
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^2	mm	kg/km	kg/km
	1 x 16 RE	10	154	238
	1 x 25 RM	12	240	337
	1 x 35 RM	13	336	428
	1 x 50 RM	14	480	551
	1 x 70 RM	16	672	751
	1 x 95 RM	18	912	1049
	1 x 120 RM	19	1152	1299
	1 x 150 RM	21	1440	1617
	1 x 185 RM	23	1776	1950
	1 x 240 RM	27	2304	2597
	2 x 1,5 RE	14	29	252
	2 x 2,5 RE	14	48	299
	2 x 4,0 RE	15	77	356
	2 x 6,0 RE	16	115	423
	2 x 10 RE	18	192	556
	2 x 16 RE	20	307	741
	2 x 25 RM	24	480	879
	3 x 1,5 RE	14	43	299
	3 x 2,5 RE	15	72	337
	3 x 4,0 RE	16	115	413
	3 x 6,0 RE	17	173	499
	3 x 10 RE	19	288	656

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 16 RE	22	461	931
	3 x 25 RM	25	720	1321
				0
	4 x 1,5 RE	15	58	266
	4 x 2,5 RE	16	96	304
	4 x 4,0 RE	17	154	390
	4 x 6,0 RE	18	230	499
	4 x 10 RE	20	384	698
	4 x 16 RM	23	614	1083
	4 x 25 RM	27	960	1539
	4 x 35 RM	29	1344	1948
	4 x 50 RM	32	1920	2607
	5 x 1,5 RE	17	72	309
	5 x 2,5 RE	18	120	385
	5 x 4,0 RE	19	192	485
	5 x 6,0 RE	20	288	618
	5 x 10 RE	22	480	855
	5 x 16 RE	26	768	1292
	5 x 25 RM	30	1200	1900
	5 x 35 RM	32	1680	2423
	5 x 50 RM	37	2400	3381
	7 x 1,5 RE	18	101	356

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

Other cross-sections and conductor counts available on request.

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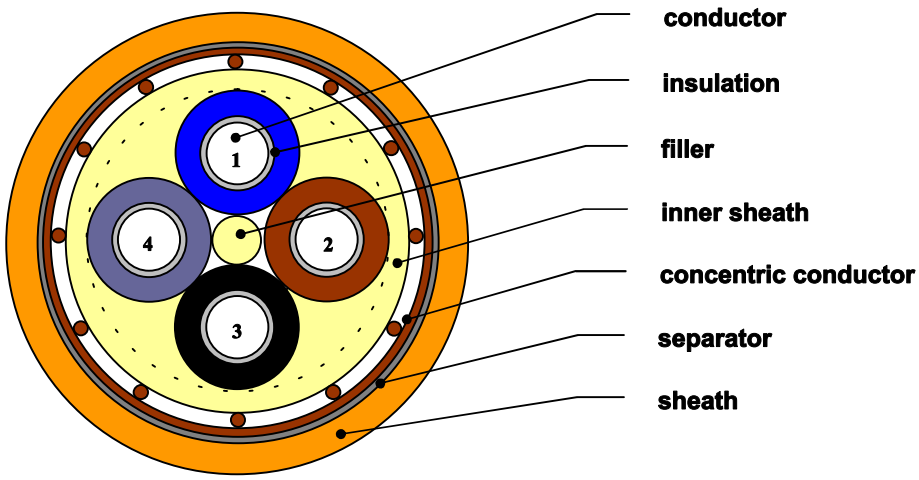
(N)HXCH FE180 PH30/E30 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXCH 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 suitable for indoor and outdoor installations.

CONSTRUCTION

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

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(N)HXCH 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^2
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
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E30	DIN 4102-12
PH30	PN-EN 50200 or PN-EN 50362
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^2	mm	kg/km	kg/km
	3 x 1,5RE/1,5	16	66	266
	3 x 2,5 RE/2,5	17	104	352
	3 x 4,0 RE/4,0	18	161	454
	3 x 6,0 RE/6,0	20	240	513
	3 x 10 RE/10	23	408	798
	3 x 16 RE/16	26	643	1159
	3 x 25 RM/16	30	902	1473
	3 x 35 RM/16	33	1190	1862
	3 x 50 RM/25	37	1723	2508
	4 x 1,5RE/1,5	15	81	320
	4 x 2,5 RE/2,5	19	128	475
	4 x 4,0 RE/4,0	20	200	570

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	4 x 6,0 RE/6,0	22	297	732
	4 x 10 RE/10	25	504	1083
	4 x 16 RE/16	26	796	1273
	4 x 25 RM/16	32	1146	1995
	4 x 35 RE/16	35	1528	2480
	4 x 50 RM/25	35	2205	2950
	7 x 1,5RE/2,5	20	133	456
	7 x 2,5 RE/2,5	21	200	561
	12 x 1,5RE/2,5	25	205	698
	12 x 2,5 RE/4,0	27	334	903

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

Other cross-sections and conductor counts available on request.

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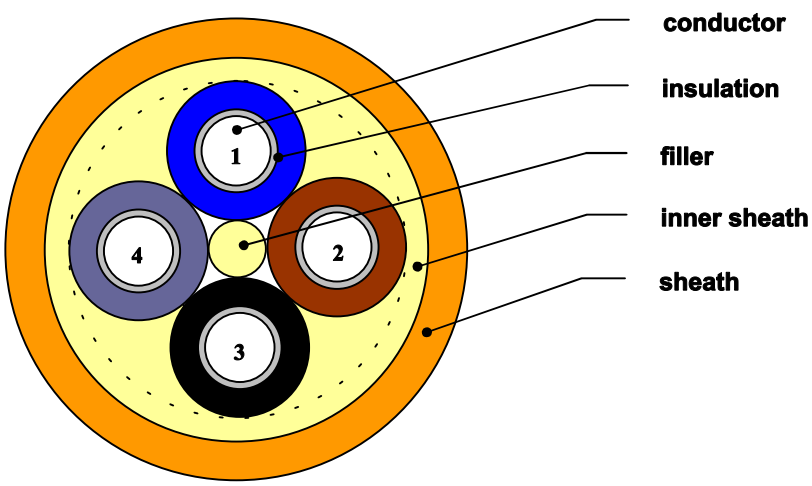
(N)HXH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXH 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 suitable for indoor and outdoor installations.

CONSTRUCTION

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

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(N)HXH 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^2
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
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
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^2	mm	kg/km	kg/km
	1 x 16 RE	10	154	250
	1 x 25 RM	12	240	355
	1 x 35 RM	13	336	450
	1 x 50 RM	14	480	580
	1 x 70 RM	16	672	790
	1 x 95 RM	18	912	1070
	1 x 120 RM	19	1152	1325
	1 x 150 RM	21	1440	1650
	1 x 185 RM	23	1776	1990
	1 x 240 RM	27	2304	2650
	2 x 1,5 RE	14	29	265
	2 x 2,5 RE	14	48	315
	2 x 4,0 RE	15	77	375
	2 x 6,0 RE	16	115	445
	2 x 10 RE	18	192	585
	2 x 16 RE	20	307	780
	2 x 25 RM	24	480	925
	3 x 1,5 RE	14	43	315
	3 x 2,5 RE	15	72	355
	3 x 4,0 RE	16	115	435
	3 x 6,0 RE	17	173	525
	3 x 10 RE	19	288	690

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 16 RE	22	461	980
	3 x 25 RM	25	720	1390
	4 x 1,5 RE	15	58	280
	4 x 2,5 RE	16	96	320
	4 x 4,0 RE	17	154	410
	4 x 6,0 RE	18	230	525
	4 x 10 RE	20	384	735
	4 x 16 RM	23	614	1140
	4 x 25 RM	27	960	1620
	4 x 35 RM	29	1344	2050
	4 x 50 RM	32	1920	2660
	5 x 1,5 RE	17	72	325
	5 x 2,5 RE	18	120	405
	5 x 4,0 RE	19	192	510
	5 x 6,0 RE	20	288	650
	5 x 10 RE	22	480	900
	5 x 16 RE	26	768	1360
	5 x 25 RM	30	1200	2000
	5 x 35 RM	32	1680	2550
	5 x 50 RM	37	2400	3450
	7 x 1,5 RE	18	101	375

RE - single wire round conductor;
RM - multiwire round conductor
Other cross-sections and conductor counts available on request.

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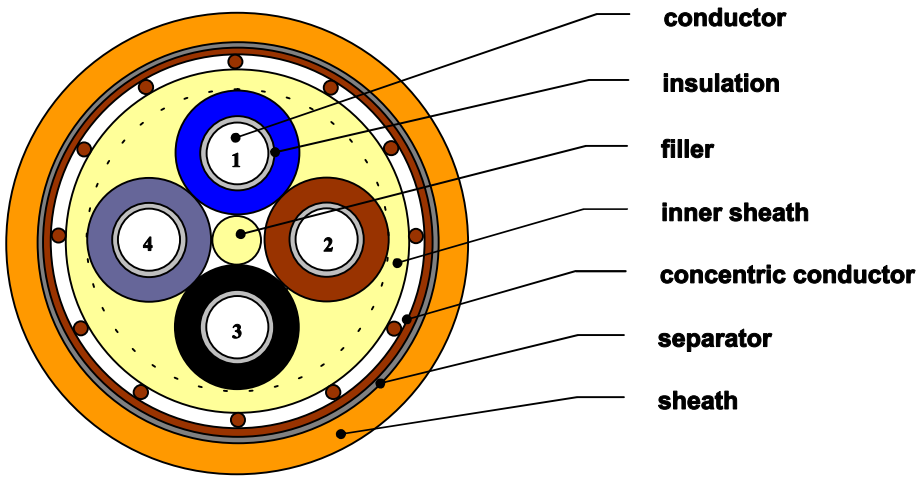
(N)HXCH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXCH 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 suitable for indoor and outdoor installations.

CONSTRUCTION

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

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(N)HXCH 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^2
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
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
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^2	mm	kg/km	kg/km
	3 x 1,5RE/1,5	16	66	280
	3 x 2,5 RE/2,5	17	104	370
	3 x 4,0 RE/4,0	18	161	478
	3 x 6,0 RE/6,0	20	240	540
	3 x 10 RE/10	23	408	840
	3 x 16 RE/16	26	643	1220
	3 x 25 RM/16	30	902	1550
	3 x 35 RM/16	33	1190	1960
	3 x 50 RM/25	37	1723	2640
	4 x 1,5RE/1,5	17	81	350
	4 x 2,5 RE/2,5	19	128	500
	4 x 4,0 RE/4,0	20	200	600

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	4 x 6,0 RE/6,0	22	297	770
	4 x 10 RE/10	25	504	1140
	4 x 16 RE/16	26	796	1340
	4 x 25 RM/16	32	1146	2100
	4 x 35 RE/16	35	1528	2610
	4 x 50 RM/25	36	2205	2995
	7 x 1,5RE/2,5	20	133	480
	7 x 2,5 RE/2,5	21	200	590
	12 x 1,5RE/2,5	25	205	735
	12 x 2,5 RE/4,0	27	334	950

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

Other cross-sections and conductor counts available on request.

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TECHNOKABEL®

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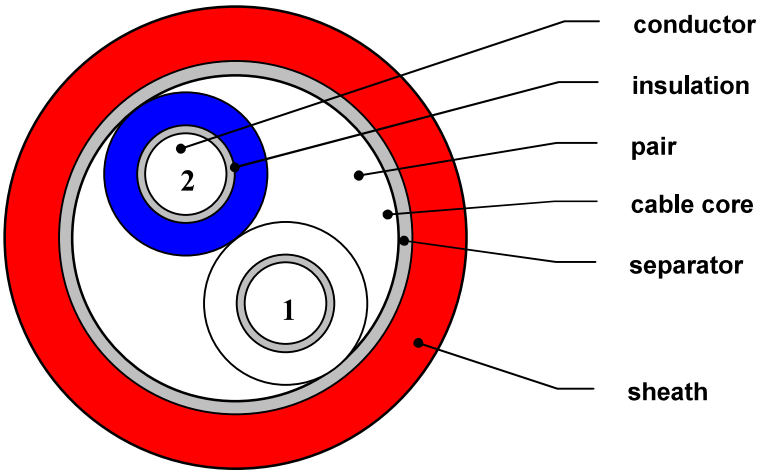
HTKSH FE180 PH90/E30-E90

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

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

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TECHNOKABEL®

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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^2	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	120
	average		60	70	70	70	100	100

Operating voltage	240 V
Voltage test	1.5 kV rms
Insulation resistance, minimum	100 MΩ·km
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from - 30 to + 80°C
during installation	from - 5 to + 70°C
Minimum bending radius	10 x cable diameter
Cable combustibility	flame retardant
Combustibility tests	PN-EN 60332-1-2
Circuit integrity *	
E30-E90	DIN 4102-12
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	10	61

Other diameters and conductor counts available on request.

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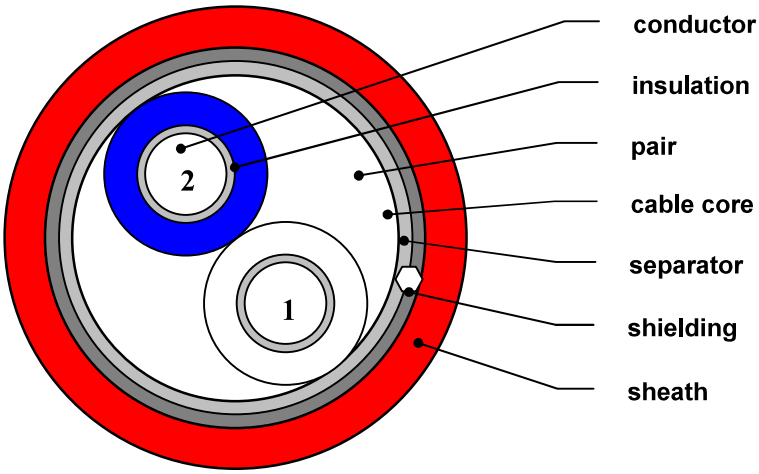
ISO 9001:2000

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

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

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ISO 9001:2000

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^2	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	200
	average		90	130	130	130	150	150

Operating voltage	240 V
Voltage test	1.5 kV rms
Insulation resistance, minimum	100 MΩ·km
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from - 30 to + 80°C
during installation	from - 5 to + 70°C
Minimum bending radius	10 x cable diameter
Cable combustibility	flame retardant
Combustibility tests	PN-EN 60332-1-2
Circuit integrity *	
E30-E90	DIN 4102-12
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

Other diameters and conductor counts available on request.

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

PRZEWODY ELEKTROENERGETYCZNE OGNIOODPORNE, BEZHALOGENOWE

ZASTOSOWANIE

Przewody elektroenergetyczne ognioodporne 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 oddymiana 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-zółta, niebieska, brązowy	brązowa, czarna i szara
4	zielono-zółta, niebieska, brązowa, czarna	czarna, niebieska i brązowa
5	zielono-zółta, 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.

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CE RoHS

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

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^2	0,75	1	1,5	2,5	4	6
Maksymalna rezystancja żył w temp. 20℃	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_o/U	300/500 V	Korozyjność wydziel. gazów	PN-EN 50267-2-3, IEC 60754-2
Próba napięciowa	2 kV sk	pH, min.	4,3
Minimalna rezystancja izolacji w temp. 20℃	100 MΩ·km	konduktywność, max.	10 µS/cm
Indukcyjność, około	0,7 mH/km	Gęstość dymu	PN-EN 61034-2
Maksymalna dopuszczalna temperatura przy żyle		przepuszczalność światła, min.	70 %
w warunkach pracy	+ 85℃	Palność kabla	nie rozprzestrzeniający płomienia
przy zwarciu (max.5 s)	+ 250℃	Próby palności	PN-EN 50266-2-2, IEC 60332-3-22 (cat.A)
Zakres temperatur pracy		Podtrzymanie funkcji:	
podczas pracy	od - 25 do + 85℃	E30-E90	DIN 4102-12
podczas układania	od -10 do + 50℃	PH90	PN-EN 50200 lub EN 50362
Minimalny promień gięcia		Trwałość izolacji FE180	IEC 60331-21; IEC 60331-11
kable jednożyłowe	10 x średnica kabla	Wykonanie wg normy	WT-TK-46
kable wielożyłowe	6 x średnica kabla		

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.
Odstępy pomiędzy podporami dla koryt i drabinek nie mogą być większe niż 1500 mm
Odstępy 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
HDGs	4 x 1,5	8,9	58	125

Symbol wyrobu	Liczba x średnica żył	Średnica zewnętrzna (około)	Indeks miedziowy	Masa kabla (około)
	mm	mm	kg/km	kg/km
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
HLGs	2 x 1	6,8	19,2	55
HLGsekw	2 x 1	7,0	19,2	65
HDGsekw	2 x 1	6,8	19,2	55

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

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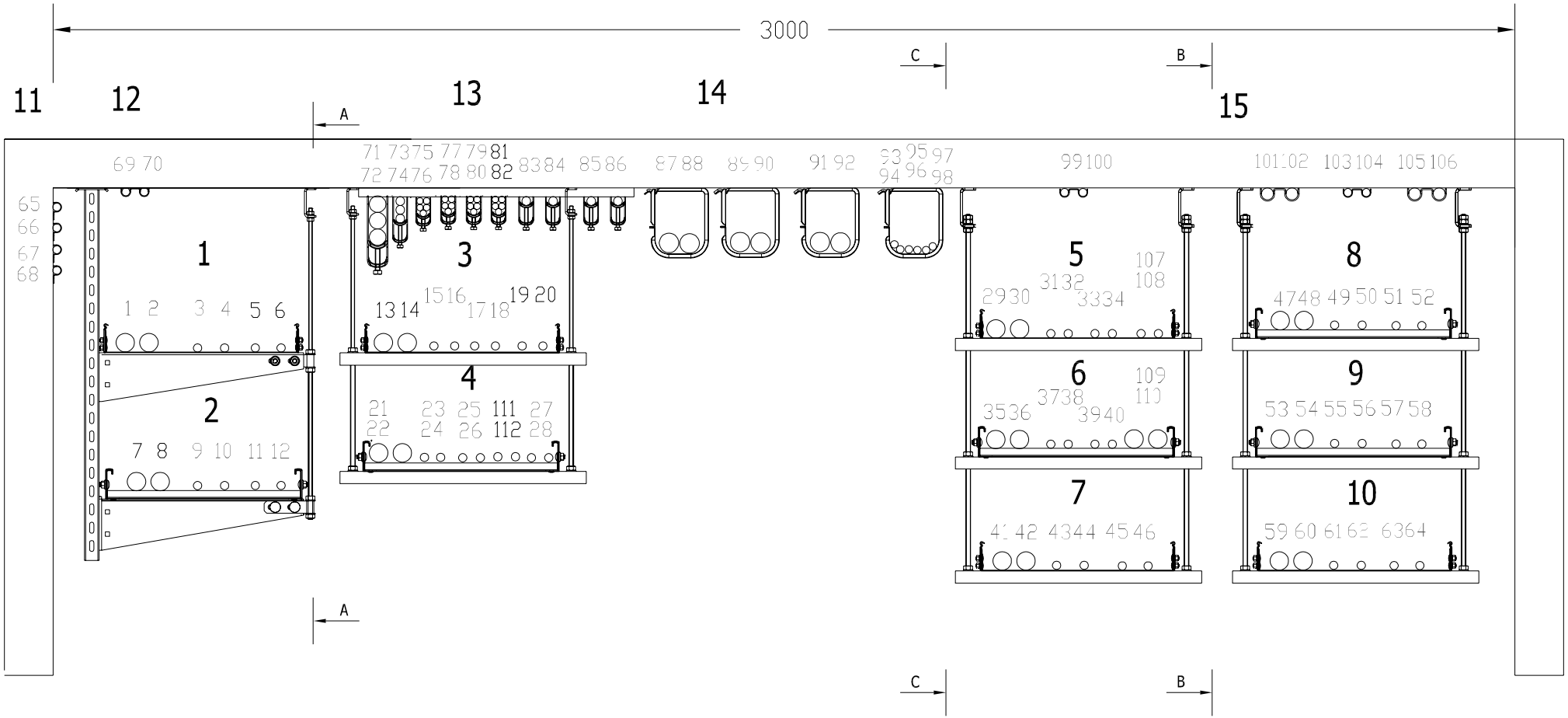


BAKS-TECHNOKABEL-
FIRES
25. 06. 2009rok

Badanie trasy kablowej BAKS - TECHNOKABEL
Badanie w FIRES Słowacja Data 23-26.06.2009

Nr	*Nr FIRES*	*Czas*	*Symbol kaba*	*Pozycja*	*Konstrukcja mocowania, odległość, obciążenie*
1	**5**		**(N)HXH 4x50 RM FE180 PH90/E90**	**1**	**Korytko kablowe KCOP 400H60/... B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO, Wysięgnik WWSO400, Łuk przegubowy LLP400H60, pręt gwintowany PGM10/..., uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85**
2	**6**		**(N)HXH 4x50 RM FE180 PH90/E90**		
3	**7**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
4	**8**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
5	**53A**		**HDGsekwżo 3x2,5 FE180 PH90/E30-E90**		
6	**53B**		**HDGsekwżo 3x2,5 FE180 PH90/E30-E90**		
7	**1**		**(N)HXCH 4x50/25 RM FE180 PH90/E90**	**2**	**Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO, Wysięgnik WWSO400, Łuk pionowy LPDZP 400H60 i Łuk pionowy LPDWP 400H60, pręt gwintowany PGM10/..., uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85**
8	**2**		**(N)HXCH 4x50/25 RM FE180 PH90/E90**		
9	**3**		**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
10	**4**		**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
11	**52A**		**HLGsekw 2x1,0 FE180 PH90/E30-E90**		
12	**52B**		**HLGsekw 2x1,0 FE180 PH90/E30-E90**		
13	**13**		**(N)HXH 4x50 RM FE180 PH90/E90**	**3**	**Korytko kablowe KCOP 400H60/... B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85**
14	**14**		**(N)HXH 4x50 RM FE180 PH90/E90**		
15	**15**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
16	**16**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
17	**60A**		**HDGszo 3x1,5 RE FE180 PH90/E30-E90**		
18	**60B**		**HDGszo 3x1,5 RE FE180 PH90/E30-E90**		
19	**61A**		**HTKSH 1x2x0,8 PH90/E30-E90**		
20	**61B**		**HTKSH 1x2x0,8 PH90/E30-E90**		
21	**9**		**(N)HXH 4x50 RM FE180 PH90/E90**	**4**	**Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85**
22	**10**		**(N)HXH 4x50 RM FE180 PH90/E90**		
23	**11**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
24	**12**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
25	**57A**		**HDGszo 3x1,5 RE FE180 PH90/E30-E90**		
26	**57B**		**HDGszo 3x1,5 RE FE180 PH90/E30-E90**		
111	**58A**		**HDGsekwżo 3x2,5 FE180 PH90/E30-E90**		
112	**58B**		**HDGsekwżo 3x2,5 FE180 PH90/E30-E90**		
27	**59A**		**HTKSHekw 1x2x0,8 PH90/E30-E90**		
28	**59B**		**HTKSHekw 1x2x0,8 PH90/E30-E90**		
29	**40**		**(N)HXH 4x50 RM FE180 PH90/E90**	**5**	**Korytko kablowe KCOP 400H60/... B-400 /1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85**
30	**41**		**(N)HXH 4x50 RM FE180 PH90/E90**		
31	**42**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
32	**43**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
33	**68A**		**HLGs 2x1,0 RE FE180 PH90/E30-E90**		
34	**68B**		**HLGs 2x1,0 RE FE180 PH90/E30-E90**		
107	**44**		**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**		
108	**45**		**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**		
35	**34**		**(N)HXH 4x50 RM FE180 PH90/E90**	**6**	**Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za**
36	**35**		**(N)HXH 4x50 RM FE180 PH90/E90**		
37	**36**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		

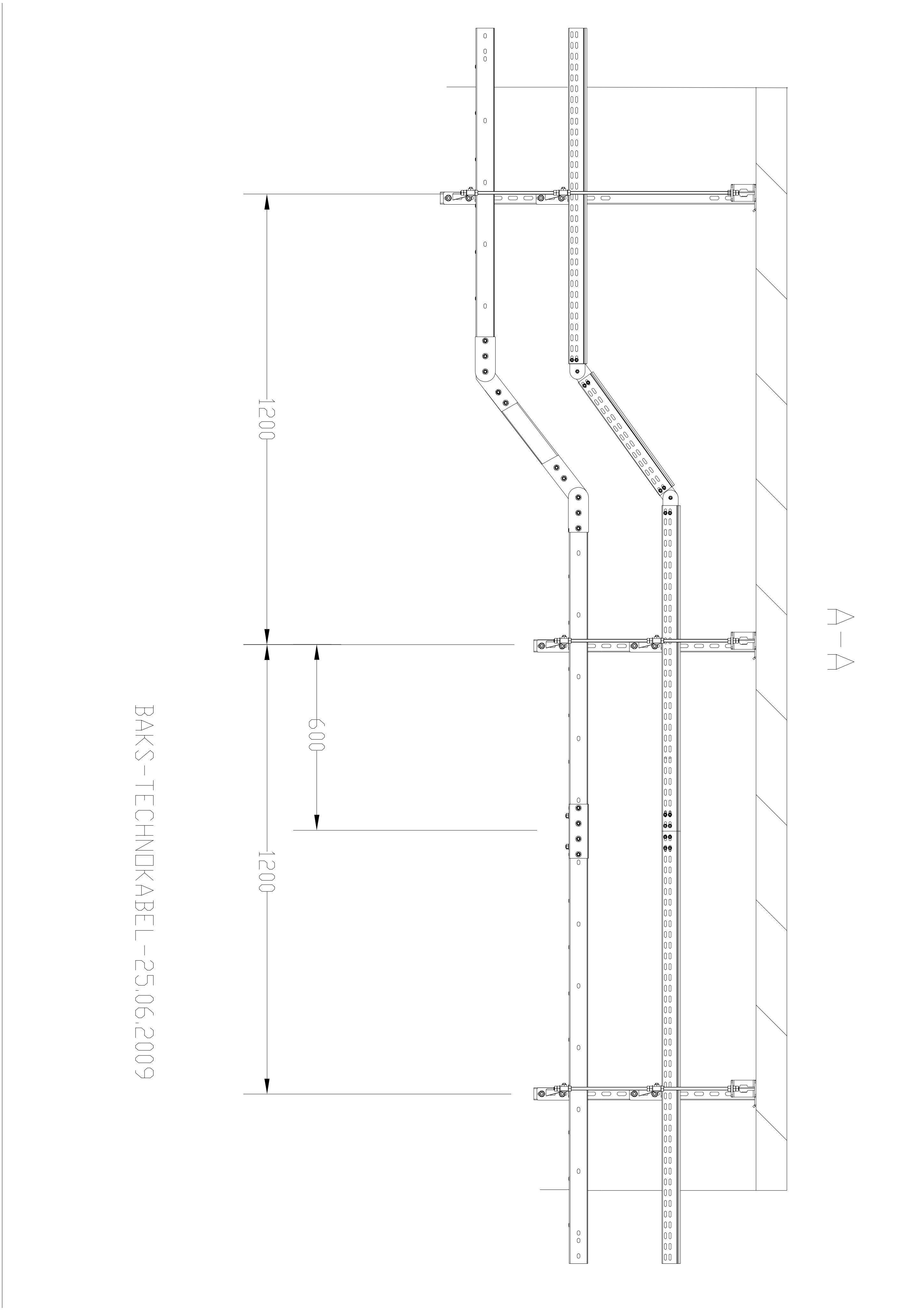
Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
38	37		(N)HXH 4x1,5 RE FE180 PH90/E90		
39	67A		HDGszo 3x1,5 RE FE180 PH90/E30-E90		
40	67B		HDGszo 3x1,5 RE FE180 PH90/E30-E90		
109	38		(N)HXH 4x50 RM FE180 PH90/E90 (1)		
110	39		(N)HXH 4x50 RM FE180 PH90/E90 (1)		
41	31		(N)HXCH 4x50/25 RM FE180 PH30/E30	7	Korytko kablowe KCOP 400H60/... B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85
42	32		(N)HXCH 4x50/25 RM FE180 PH30/E30		
43	33		(N)HXCH 4x1,5/1,5 RE FE180 PH30/E30		
44			(N)HXCH 4x1,5/1,5 RE FE180 PH30/E30		
45	66A		HLGsekw 2x1,0 FE180 PH90/E30-E90		
46	66B		HLGsekw 2x1,0 FE180 PH90/E30-E90		
47	50		(N)HXCH 4x50/25 RM FE180 PH30/E30	8	Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85
48			(N)HXCH 4x50/25 RM FE180 PH30/E30		
49	51		(N)HXCH 4x1,5/1,5 RE FE180 PH30/E30		
50			(N)HXCH 4x1,5/1,5 RE FE180 PH30/E30		
51	71A		HLGs 2x1,0 FE180 PH90/E30-E90		
52	71B		HLGs 2x1,0 FE180 PH90/E30-E90		
53	48		(N)HXH 4x50 RE FE180 PH30/E30	9	Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85
54			(N)HXH 4x50 RE FE180 PH30/E30		
55	49		(N)HXH 4x1,5 RE FE180 PH30/E30		
56			(N)HXH 4x1,5 RE FE180 PH30/E30		
57	70A		HLGs 2x1,0 FE180 PH90/E30-E90		
58	70B		HLGs 2x1,0 FE180 PH90/E30-E90		
59	46		(N)HXH 4x50 RM FE180 PH30/E30	10	Korytko kablowe KCOP 400H60/... B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, uchwyt USO12 do betonu za pomocą stalowego łącznika rozporowego PSRn M10x85.
60			(N)HXH 4x50 RM FE180 PH30/E30		
61	47		(N)HXH 4x1,5 RE FE180 PH30/E30		
62			(N)HXH 4x1,5 RE FE180 PH30/E30		
63	69A		HLGs 2x1,0 FE180 PH90/E30-E90		
64	69B		HLGs 2x1,0 FE180 PH90/E30-E90		
65	54A		HDGszo 3x1,5 RE FE180 PH90/E30-E90	11	Uchwyty kablowe UDF Mocowanie do betonu komurkowego co 600 mm za pomocą gwoździ stalowych ocynkowanych o długości co najmniej 75 mm
66	54B		HDGszo 3x1,5 RE FE180 PH90/E30-E90		
67	55A		HLGs 2x1,0 FE180 PH90/E30-E90		
68	55B		HLGs 2x1,0 FE180 PH90/E30-E90		
69	56A		HDGsekwżo 3x2,5 FE180 PH90/E30-E90	12	Uchwyty kablowe UEF. Mocowanie do betonu co 600mm za pomocą kołka GSO 6x40
70	56B		HDGsekwżo 3x2,5 FE180 PH90/E30-E90		
71	17		(N)HXH 4x50 RM FE180 PH90/E90	13	Uchwyt kablowy UKO2 + Szczebel SDOC 500 Mocowanie do betonu co 600 mm za pomocą stalowego łącznika rozporowego SRO M6x30 Po 3 kable w uchwycie
72			(N)HXH 4x50 RM FE180 PH90/E90		
73	18		(N)HXH 4x1,5 RE FE180 PH90/E90		
74			(N)HXH 4x1,5 RE FE180 PH90/E90		
75	62A		HDGszo 3x1,5 RE FE180 PH90/E30-E90		Uchwyt kablowy UKO1 + Szczebel SDOC 500 Mocowanie do betonu co 600 mm za pomocą stalowego łącznika rozporowego SRO M6x30 Po 5 kabli w uchwycie
76	62B		HDGszo 3x1,5 RE FE180 PH90/E30-E90		
77	63A		HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90		
78	63B		HDGsekwżo 3x2,5 RE FE180 PH90/E30-E90		
79	64A		HLGs 2x1,0 FE180 PH90/E30-E90		

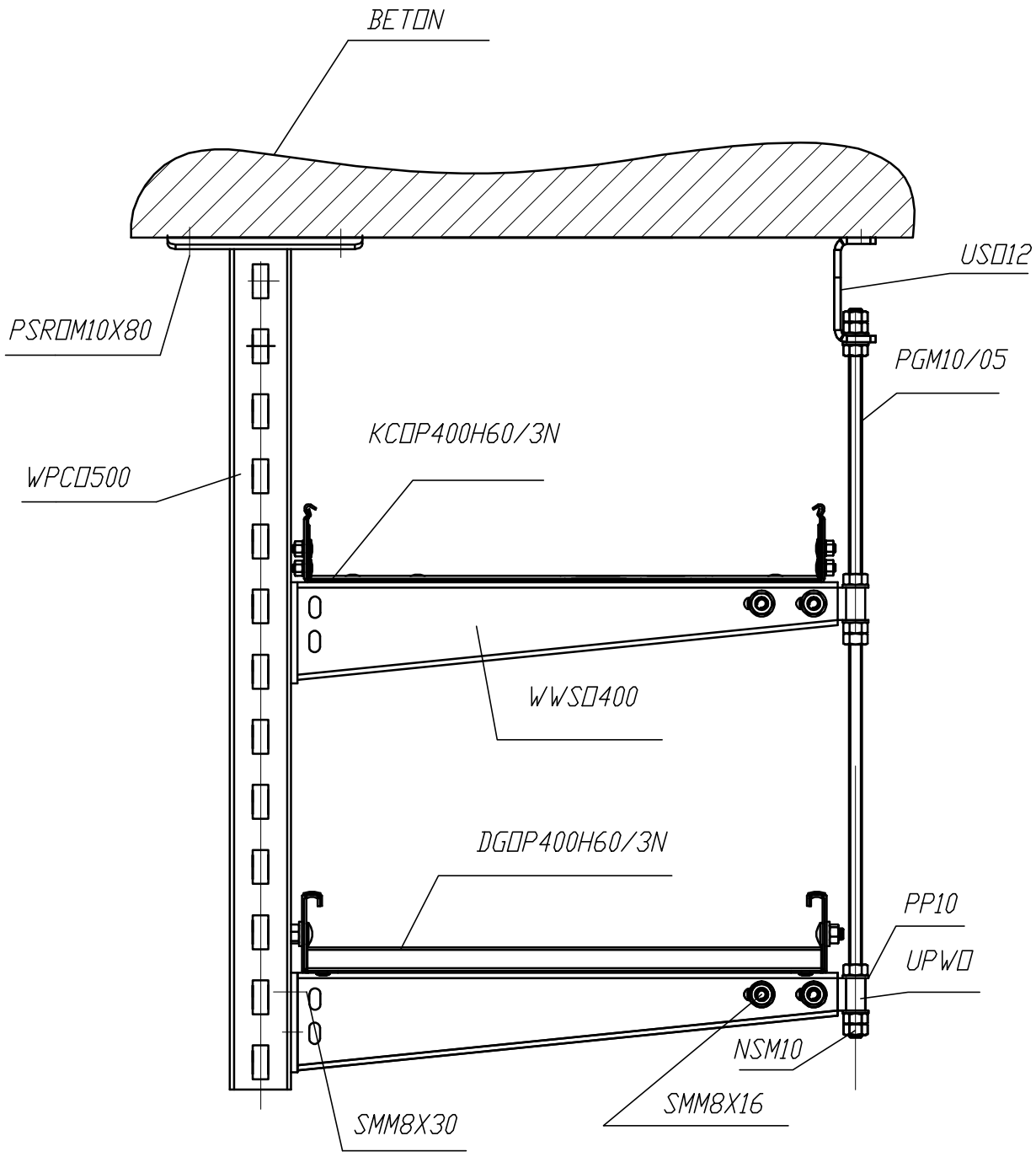
Nr	*Nr FIRES*	*Czas*	*Symbol kaba*	*Pozycja*	*Konstrukcja mocowania, odległość, obciążenie*
80	**64B**		**HLGs 2x1,0 FE180 PH90/E30-E90**		
81	**65A**		**HLGsekw 2x1,0 FE180 PH90/E30-E90**		
82	**65B**		**HLGsekw 2x1,0 FE180 PH90/E30-E90**		
83	**19**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		**Uchwyt kablowy UKO1 + Szczebel SDOC 500 stalowego łącznika rozporowego SRO M6x30** **Po 1 kablu w uchwycie**
84			**(N)HXH 4x1,5 RE FE180 PH90/E90**		
85	**20**		**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
86			**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
87	**21**		**(N)HXH 4x50 RM FE180 PH90/E90**	**14**	**Obejma OZO** **Mocowanie do betonu co 600 mm za pomocą stalowego łącznika rozporowego SRO M6x30**
88			**(N)HXH 4x50 RM FE180 PH90/E90**		
89	**22**		**(N)HXCH 4x50/25 RM FE180 PH90/E90**		
90			**(N)HXCH 4x50/25 RM FE180 PH90/E90**		
91	**23**		**(N)HXH 4x50 RM FE180 PH90/E90 (1)**		
92			**(N)HXH 4x50 RM FE180 PH90/E90 (1)**		
93	**24**		**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**		
94			**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**		
95	**25**		**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
96			**(N)HXCH 4x1,5/1,5 RE FE180 PH90/E90**		
97	**26**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
98			**(N)HXH 4x1,5 RE FE180 PH90/E90**		
99	**27**		**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**	**15**	**Uchwyty kablowe UEF** **Mocowanie do betonu co 600 mm za pomocą stalowego łącznika rozporowego KWBO M6x40**
100			**(N)HXH 4x1,5 RE FE180 PH90/E90 (1)**		
101	**28**		**(N)HXH 4x50 RM FE180 PH90/E90 (1)**		
102			**(N)HXH 4x50 RM FE180 PH90/E90 (1)**		
103	**29**		**(N)HXH 4x1,5 RE FE180 PH90/E90**		
104			**(N)HXH 4x1,5 RE FE180 PH90/E90**		
105	**30**		**(N)HXH 4x50 RM FE180 PH90/E90**		
106			**(N)HXH 4x50 RM FE180 PH90/E90**		

Zestawienie kabli Technokabel:

Lp	Symbol kaba		Średnica kabla	Ciężar kabla	Ilość
1	(N)HXH	FE 180 PH30/E30 4x 1,5 RE	14 mm	0,28 kg/m	4
2	(N)HXH	FE 180 PH30/E30 4x 50 RM	33 mm	2,8 kg/m	4
3	(N)HXCH	FE 180 PH30/E30 4x 1,5/1,5 RE	15 mm	0,32 kg/m	4
4	(N)HXCH	FE 180 PH30/E30 4x 50/25 RM	35 mm	3,0 kg/m	4
5	(N)HXH	FE 180 PH90/E90 4x 1,5 RE	15 mm	0,30 kg/m	18
6	(N)HXH	FE 180 PH90/E90 4x 50 RM	34 mm	2,8 kg/m	16
7	(N)HXH	FE 180 PH90/E90 4x 1,5 RE (1)	15 mm	0,30 kg/m	6
8	(N)HXH	FE 180 PH90/E90 4x 50 RM (1)	34 mm	2,8 kg/m	6
9	(N)HXCH	FE 180 PH90/E90 4x 1,5/1,5 RE	15 mm	0,33 kg/m	6
10	(N)HXCH	FE 180 PH90/E90 4x 50/25 RM	36 mm	3,0 kg/m	4
11	HDGszo	FE180 PH90/E30-E90 3x1,5 RE	8 mm	0,09 kg/m	10
12	HDGsekwżo	FE180 PH90/E30-E90 3x2,5 RE	10 mm	0.14 kg/m	8
13	HLGs	FE180 PH90/E30-E90 2x1,0 mm^2	7 mm	0,06 kg/m	12
14	HLGsekw	FE180 PH90/E30-E90 2x1,0 mm^2	7 mm	0,06 kg/m	6
15	HTKSH	FE180 PH90/E30-E90 1x2x0,8 mm	8 mm	0,07 kg/m	2
16	HTKSHekw	FE180 PH90/E30-E90 1x2x0,8 mm	8 mm	0,07 kg/m	2

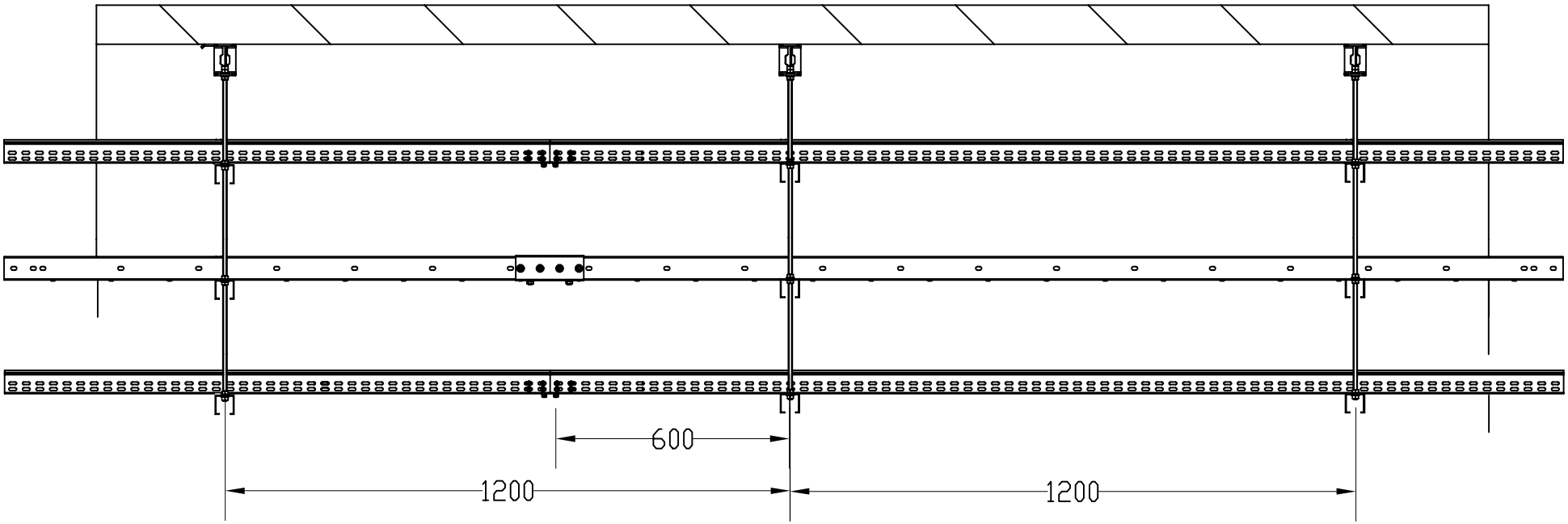
Pozycja 3, 4, stal ocynkowana metodą ogniową PN -EN 1461:2000
Pozycja 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 stal ocynkowana metodą Sendzimira PN -EN 10327



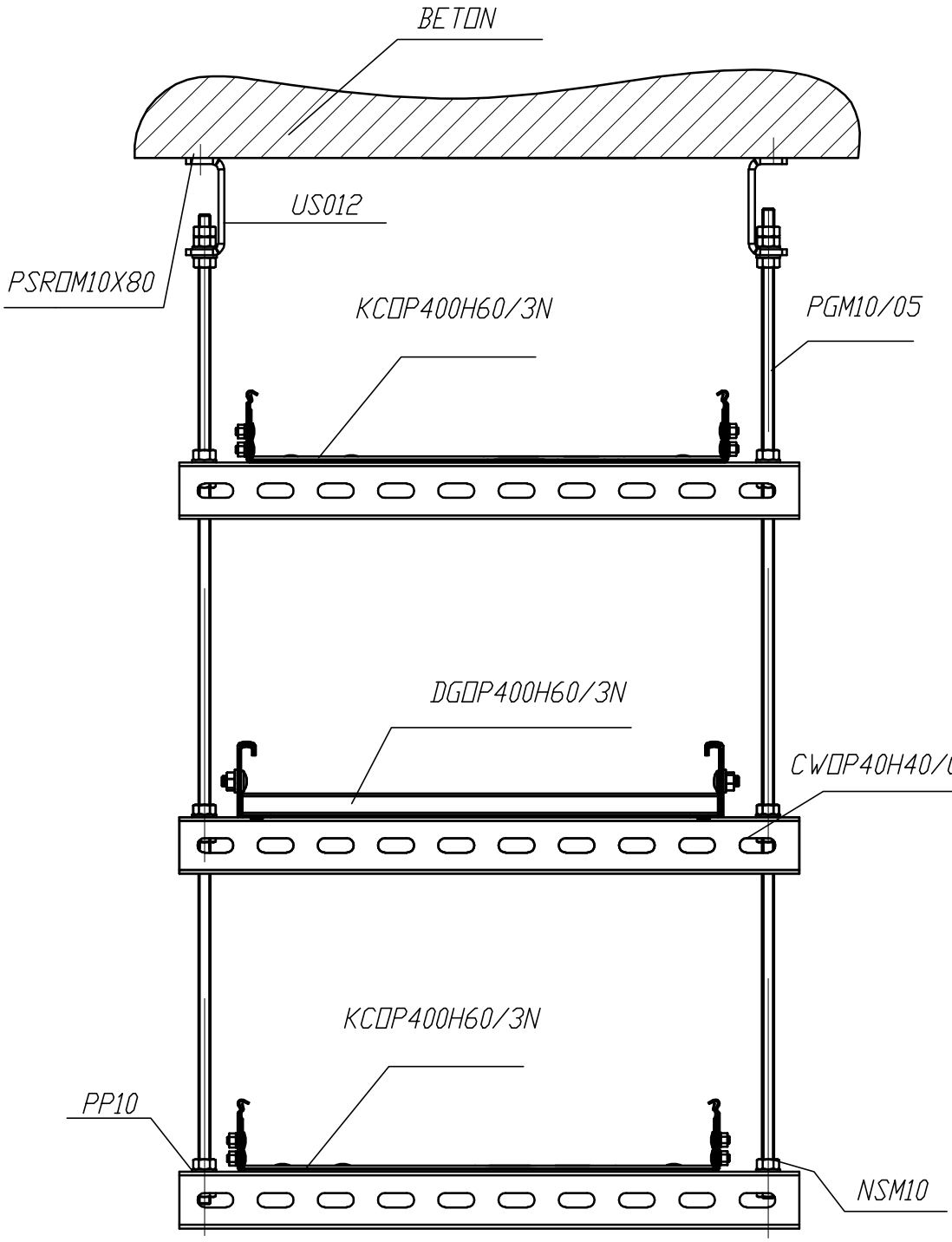


	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		-----		Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysował	Piotr Okniński		17.06.2009	Układ 1			
Sprawdził							
Zatwierdził				Nr programu maszynowego ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nr rysunku			

C-C

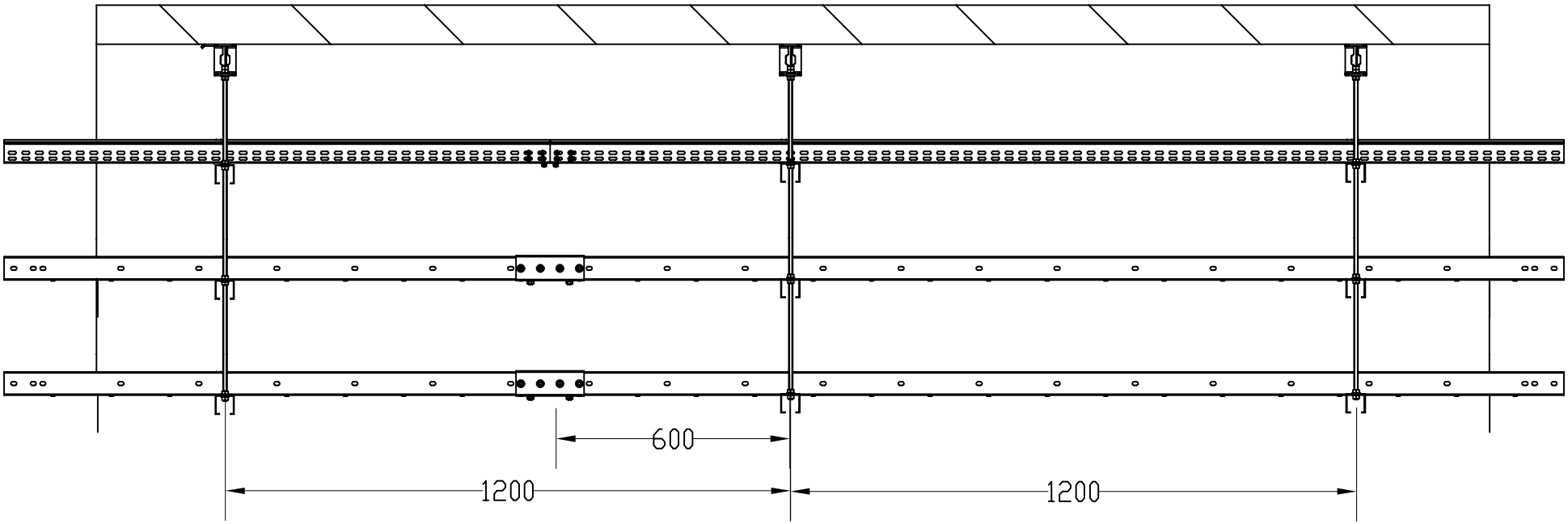


BAKS-TECHN□KABEL-25.06.2009



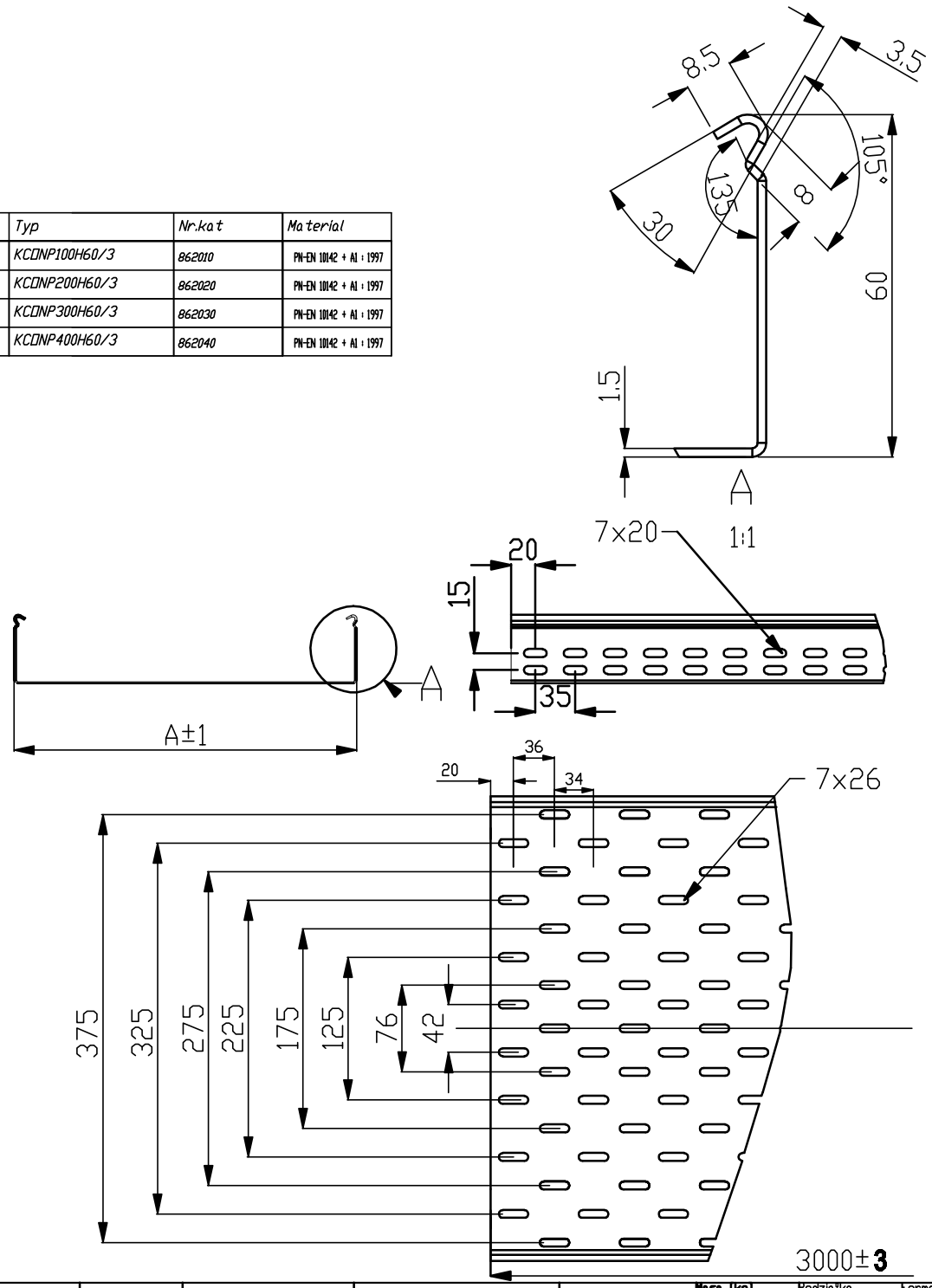
Odchyłka wymiarów) nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		-----		Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysował	Piotr Okniński		17.06.2009	Układ 2.			
Sprawdził							
Zatwierdził				Nr programu maszynowego ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nr rysunku			

B-B

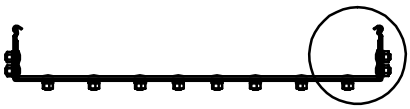


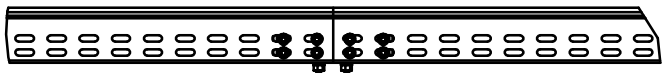
BAKS-TECHN□KABEL-25.06.2009

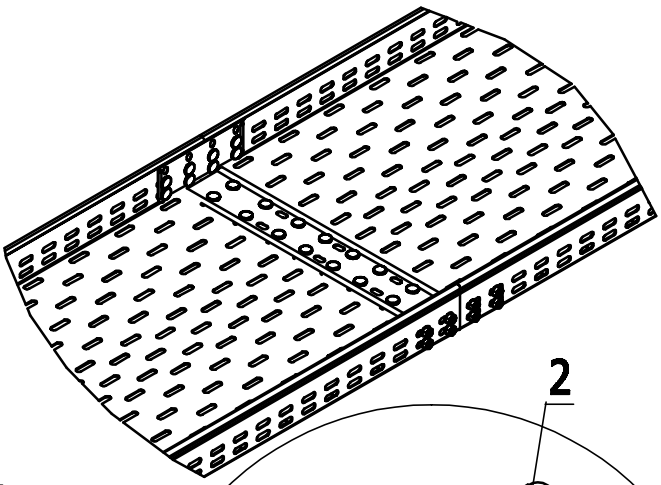
A	Typ	Nr.kat	Material
100	KC□NP100H60/3	862010	PN-EN 10142 + A1 : 1997
200	KC□NP200H60/3	862020	PN-EN 10142 + A1 : 1997
300	KC□NP300H60/3	862030	PN-EN 10142 + A1 : 1997
400	KC□NP400H60/3	862040	PN-EN 10142 + A1 : 1997

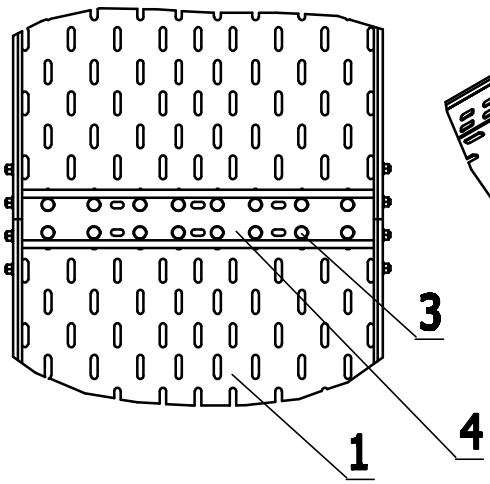


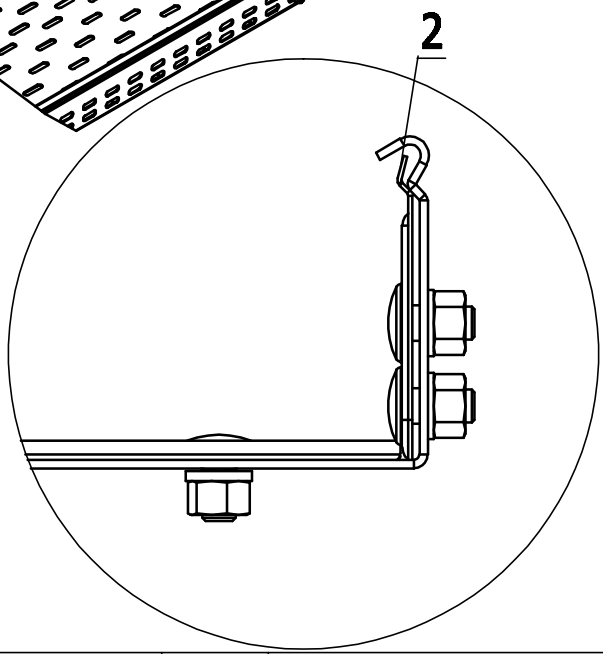
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:5	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko J.GRODCHOWSKI	Podpis	Data 20.10.05	Nazwa rysunku				
Rysował	J.Grochowski		20.10.05	KC□NP400H60/3				
Sprawdził	T.WŁODARCZYK		20.10.05					
Zatwierdził	J.KLICZEK		20.10.05	Nr programu maszynowego				Nr zmiany
Profesjonalne Systemy Tras Kablowych				862040				











Poz.1		Poz.4
A	Typ	Typ
100	KC□NP100H60/3	BL□N100
200	KC□NP200H60/3	BL□N200
300	KC□NP300H60/3	BL□N300
400	KC□NP400H60/3	BL□N400

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
4	Blacha lacznikowa	BL□N400		1	652440
3	śruba	SGN M6x12		32	650442
2	łącznik	LP□NPH60		2	860700
1	koryto	KC□NP400H60/3		1	862040

Odchylka wymiarów nietolerowanych

Material: Gatunek; Nr normy; polfabrykat (nr normy)

Masa [kg]

Podziałka 7:50

Format A4; Arkusz 1; Arkuszy 1

	Nazwisko	Podpis	Data
Projektował			
Rysował	J.Grochowski		21-Nov-06
Sprawdził			
Zatwierdził			

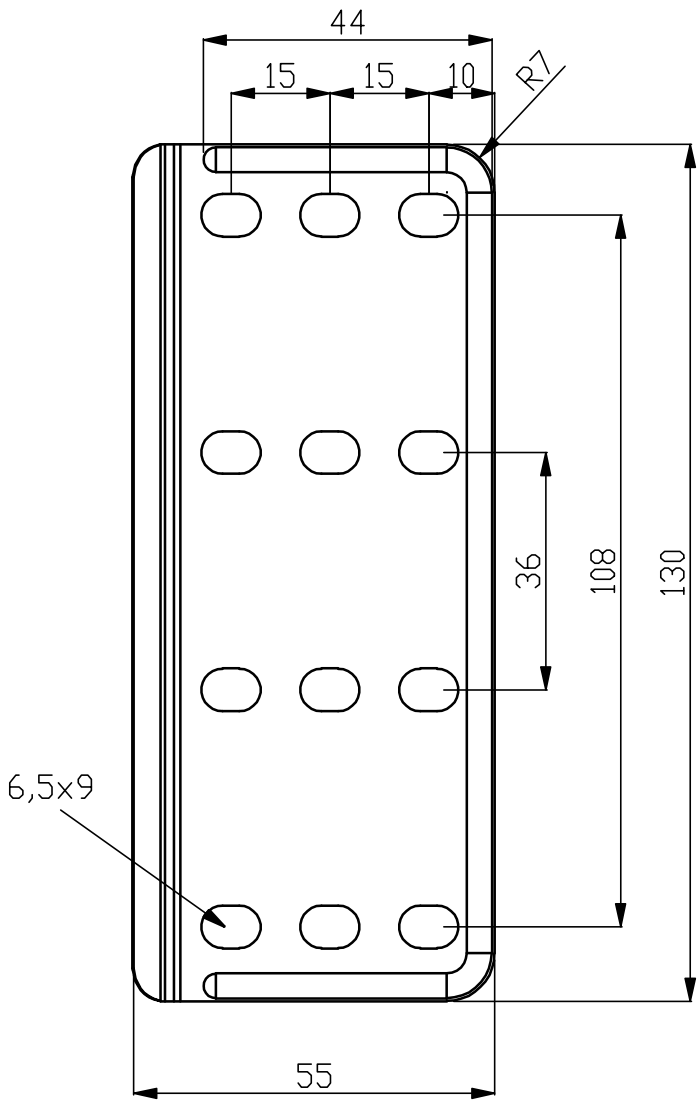
Nazwa rysunku: KC□NP400H60/3

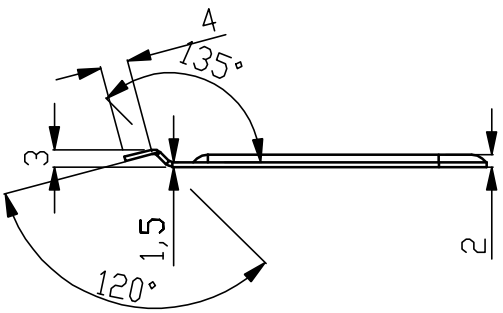
Nr programu maszynowego

Nr zmiany

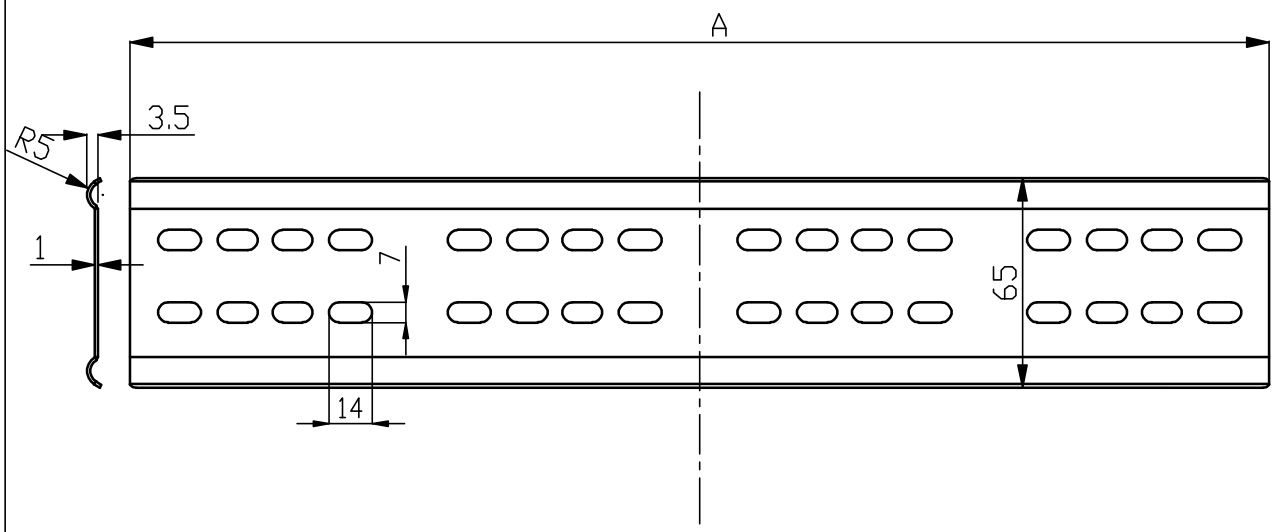
Profesjonalne Systemy Tras Kablowych

Nr rysunku: 862040



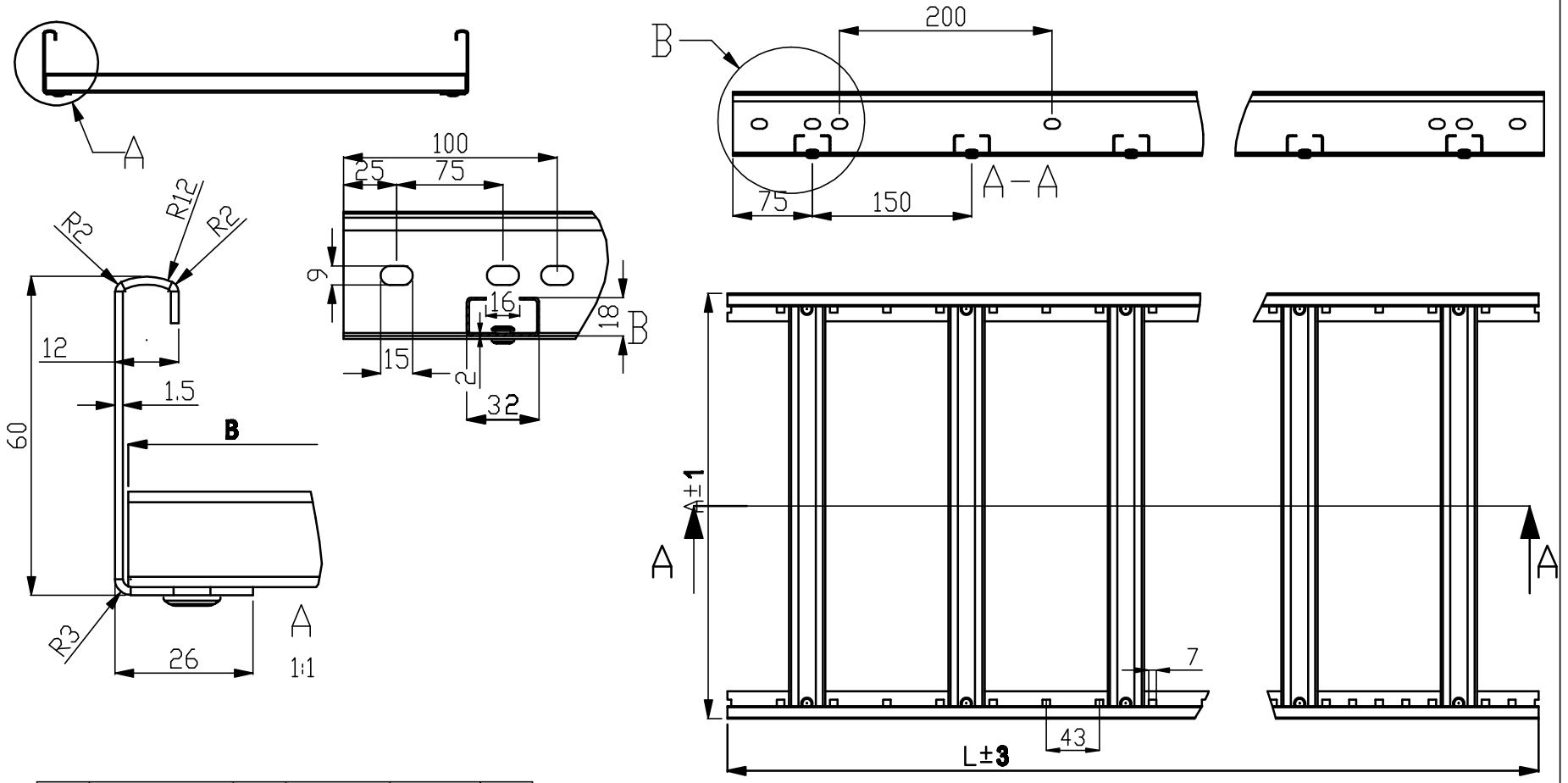


	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997		1:1	Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko J.GRODCHOWSKI	Podpis	Data 20.10.05	Nazwa rysunku LPOPH60N				
Rysował	J.Grochowski		20.10.05					
Sprawdził	T.WLODARCZYK		20.10.05					
Zatwierdził	J.KLICZEK		20.10.05					Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku 860700				



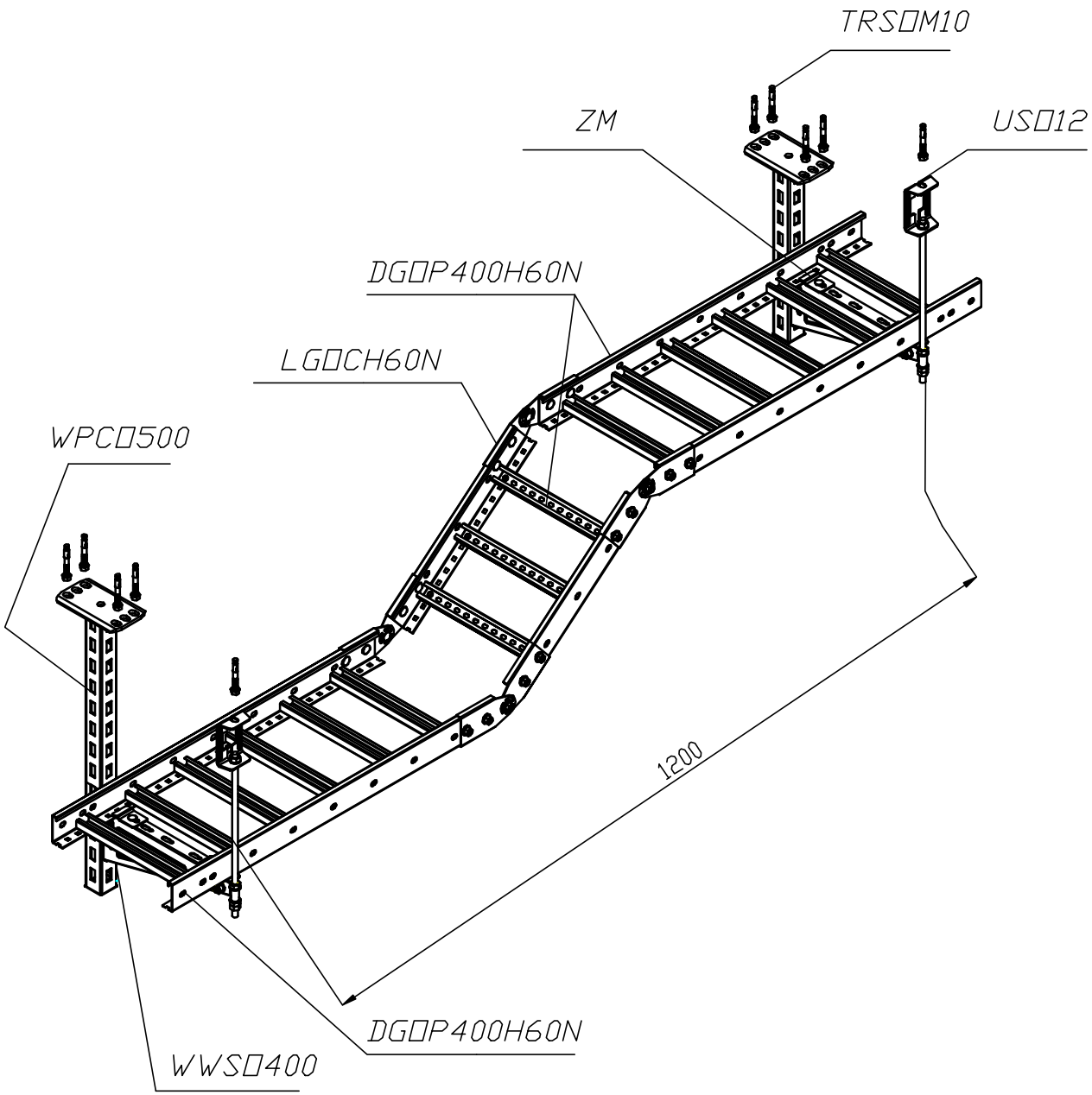
A	Typ	Nr.kat	Material
90	BL□100N	862510	PN-EN 10142 + A1 : 1997
190	BL□200N	862520	PN-EN 10142 + A1 : 1997
290	BL□300N	862530	PN-EN 10142 + A1 : 1997
390	BL□400N	862540	PN-EN 10142 + A1 : 1997

	Dachyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997		1:2	Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko J.GRODHOWSKI	Podpis	Data 20.10.05	Nazwa rysunku				
Rysował	J.Grochowski		20.10.05	BL□400N				
Sprawdził	T.WŁODARCZYK		20.10.05					
Zatwierdził	J.KLICZEK		20.10.05	Nr programu				Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nazwa programu				

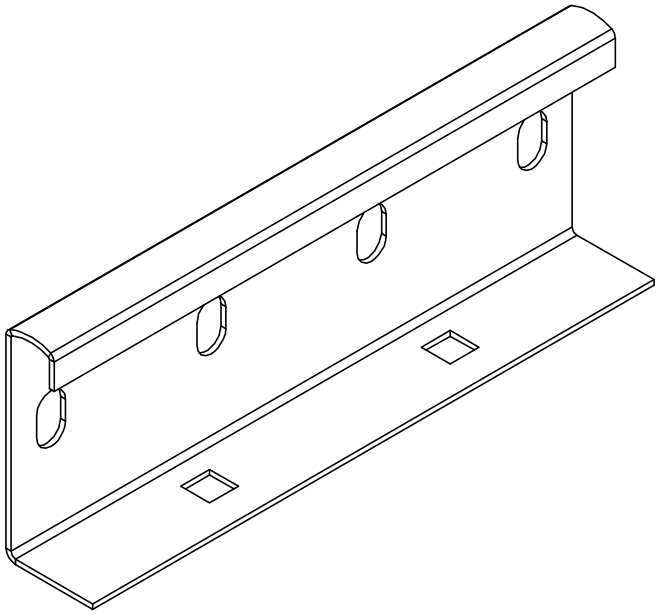


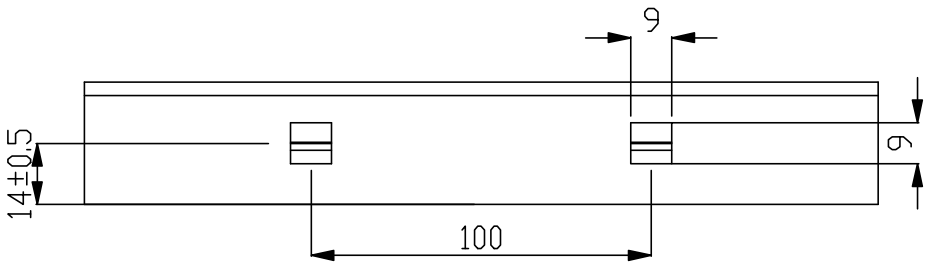
A	Typ	L	Nr. Kat	materiał	B
100	DG□P100H60/6N	6000	863010	PN-EN 10142 + A1 : 1997	95
200	DG□P200H60/6N	6000	863020	PN-EN 10142 + A1 : 1997	195
300	DG□P300H60/6N	6000	863030	PN-EN 10142 + A1 : 1997	295
400	DG□P400H60/6N	6000	863040	PN-EN 10142 + A1 : 1997	395
100	DG□P100H60/3N	3000	863013	PN-EN 10142 + A1 : 1997	95
200	DG□P200H60/3N	3000	863023	PN-EN 10142 + A1 : 1997	195
300	DG□P300H60/3N	3000	863033	PN-EN 10142 + A1 : 1997	295
400	DG□P400H60/3N	3000	863043	PN-EN 10142 + A1 : 1997	395

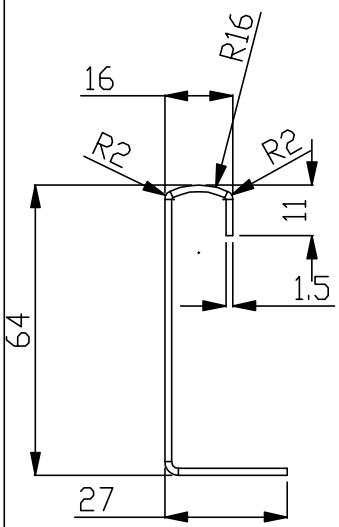
	□dchyłka wymiarów) nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:5	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko		Podpis	Data	Nazwa rysunku			
Rysował	PIOTR □KNIŃSKI			18.06.2009	DG□P400H60/3N			
Sprawdził								
Zatwierdził	JKLICZEK				Nr programu		Nr zmiany	
BAKS Profesjonalne Systemy Tras Kablowych					Nr rysunku	---		

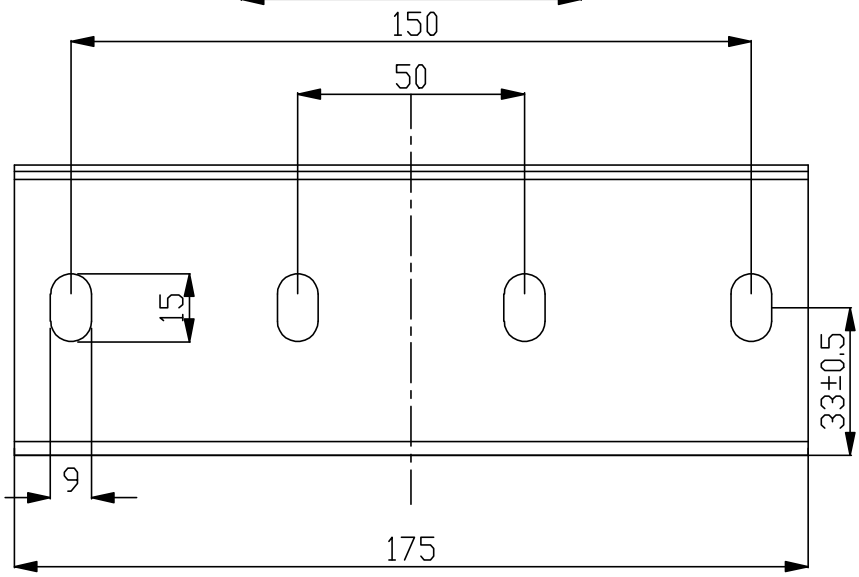


	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku				
Rysował	P.Okniński		24.06.09	Drabinka z zawiesiem				
Sprawdził				Nr programu				Nr zmiany
Zatwierdził				Nr rysunku				
Profesjonalne Systemy Tras Kablowych								

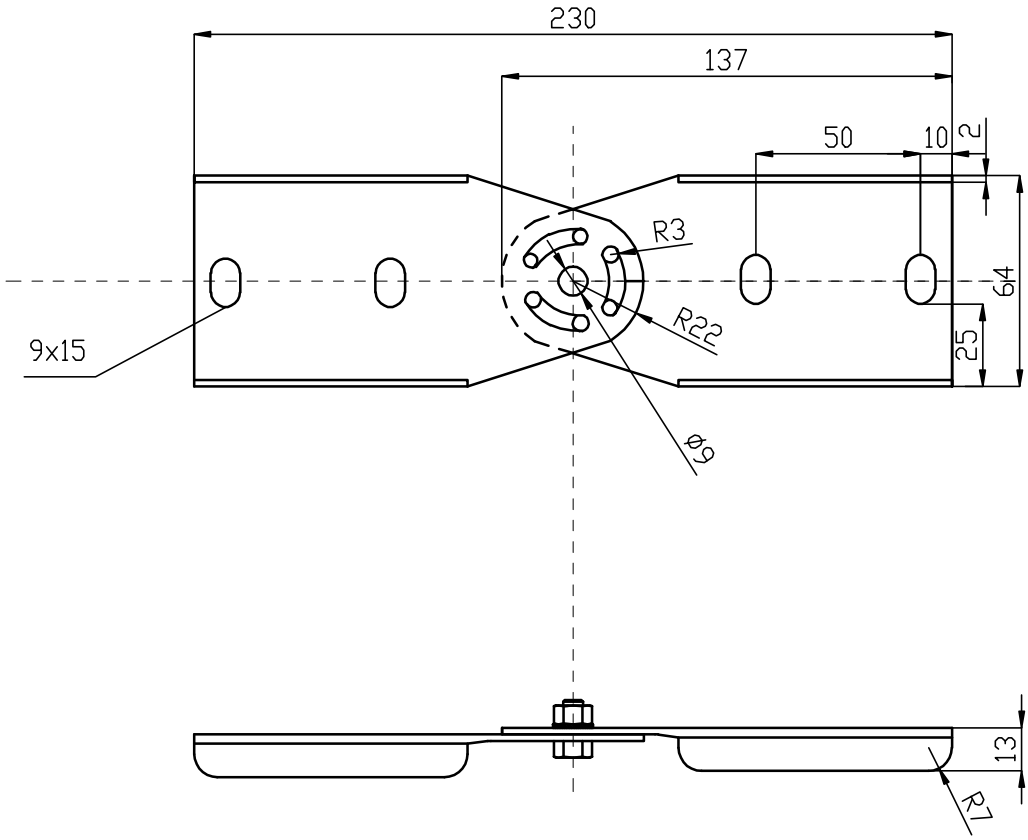






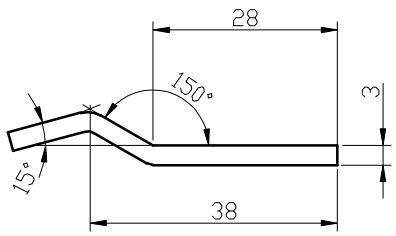


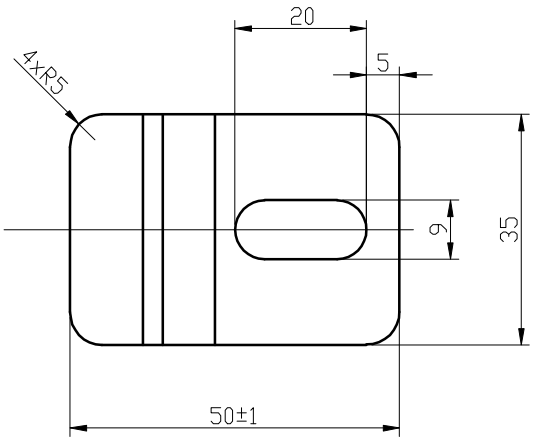
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy				Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	J.GRODHOWSKI	Podpis	Data	20.10.05	Nazwa rysunku	LDONCH60	
Rysował		J.Grochowski			20.10.05			
Sprawdził		T.WLODARCZYK			20.10.05			
Zatwierdził		J.KLICZEK			20.10.05	Nr programu		Nr zmiany
Profesjonalne Systemy Tras Kablowych						Nazwa zamiennego		



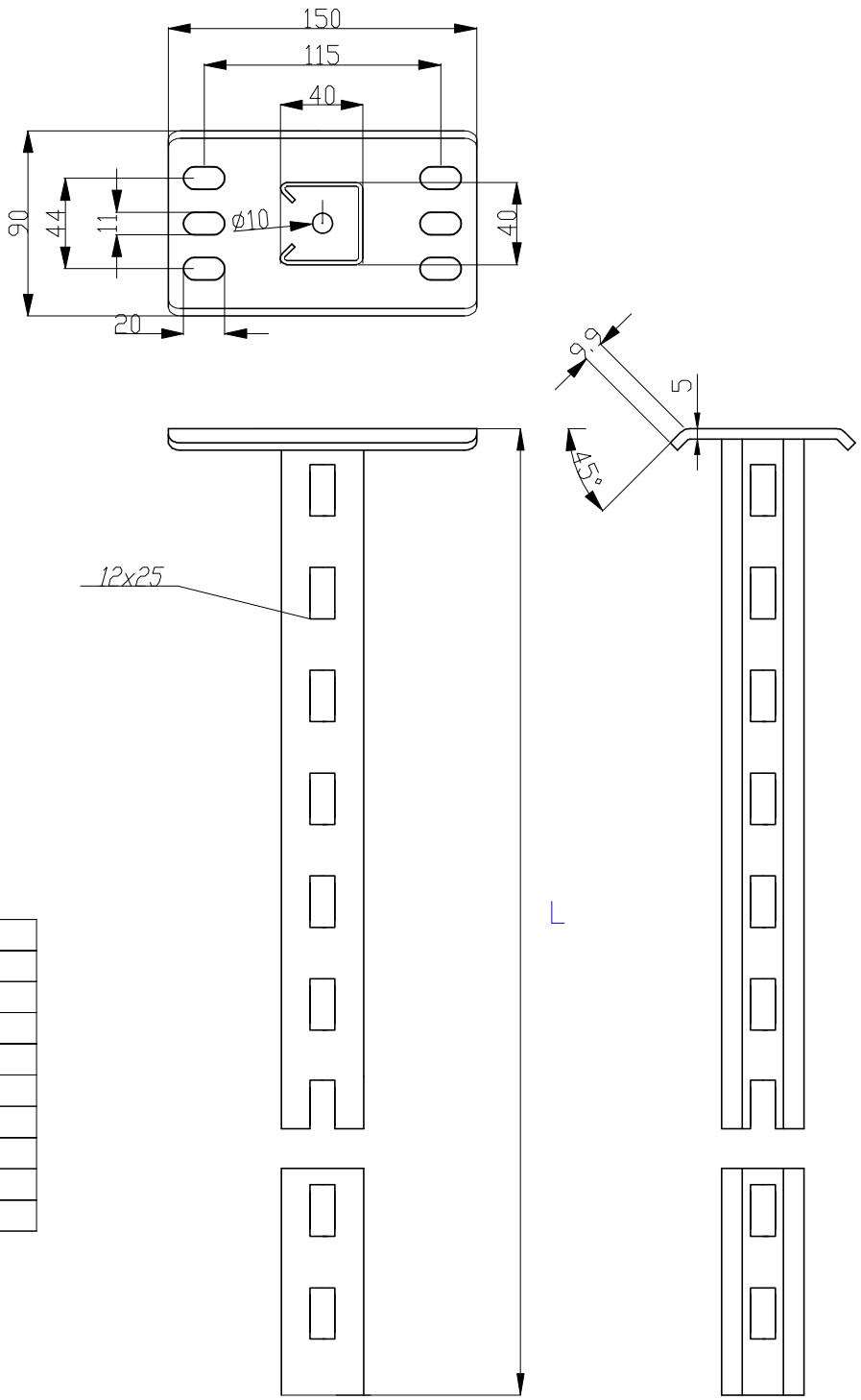
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku				
Rysował	P.Okniński		24.06.09	LGOCH60N				
Sprawdził				Nr programu				Nr zmiany
Zatwierdził				Nr rysunku				

Profesjonalne Systemy Tras Kablowych





	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997	0.025	1:1	Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko T.Grudniewski	Podpis	Data	2004.12.29	Nazwa rysunku ZMO			
Rysował	J.Jasiński			2004.12.29				
Sprawdził	J.Kliczek			2004.12.29				
Zatwierdził	J.Kliczek			2004.12.29	Nr programu maszynowego ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych					Nr rysunku 802900			



L	Typ	Nr.kat
200	WPC□200N	
300	WPC□300N	
400	WPC□400N	
500	WPC□500N	
600	WPC□600N	
700	WPC□700N	
800	WPC□800N	
900	WPC□900N	
1000	WPC□1000N	

	□dchyłka wymiarów) nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka
				Nr normy		--	1:3
				półfabrykat (nr normy)			

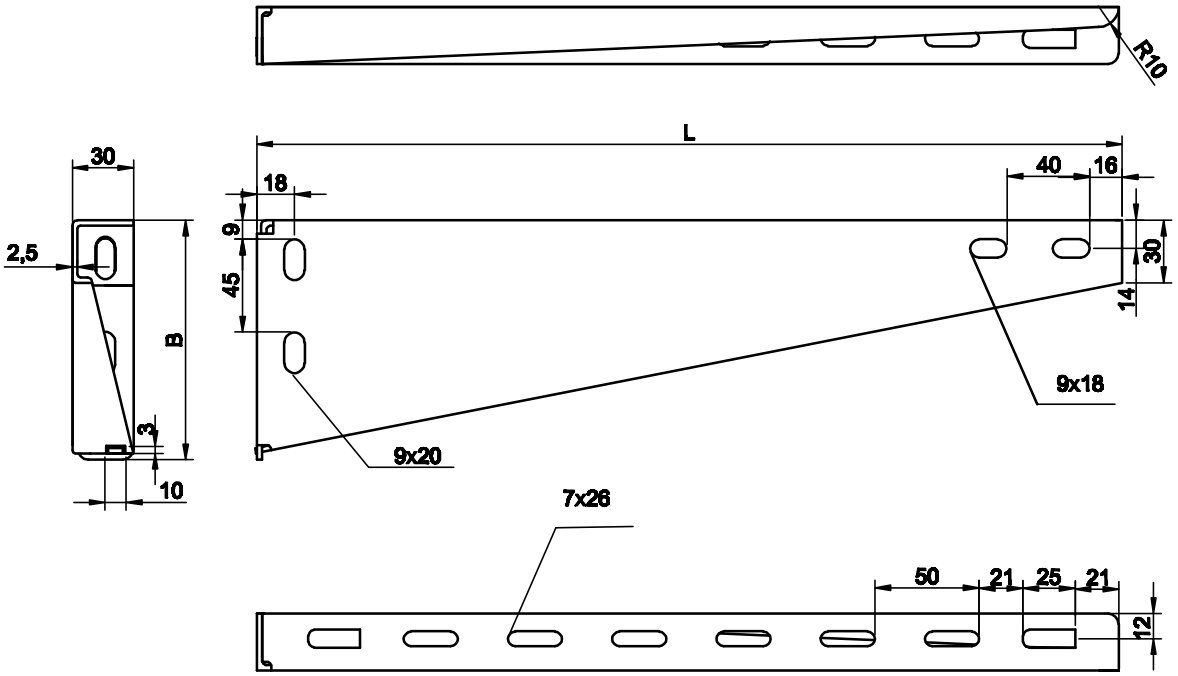
Format A4
Arkusz 1
Arkuszy 1

Projektował	Nazwisko	Piotr □kniński	Podpis	25.03.09	Nazwa rysunku
Rysował		Piotr □kniński		25.03.09	WPC□
Sprawdził		J.Kliczek		25.03.09	
Zatwierdził		J.Kliczek		25.03.09	Nr programu maszynowego ---

Nr zmiany

Nr rysunku

Profesjonalne Systemy
Tras Kablowych



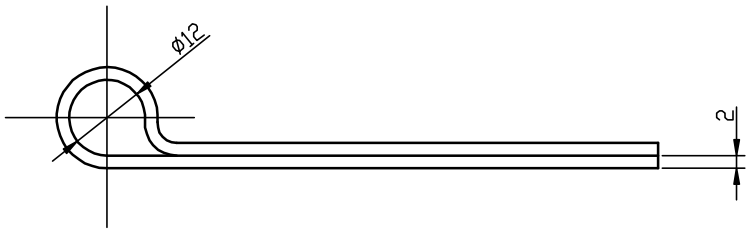
Symbol	L	B
WWSO400	415	115
WWSO300	315	115
WWSO200	215	90
WWSO100	115	80

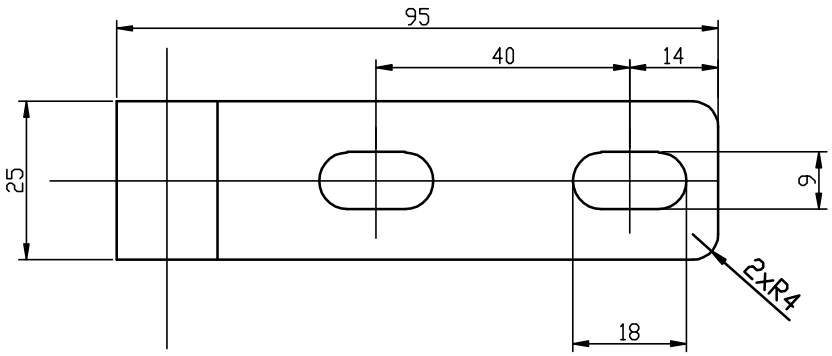
Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:3	Format A4
		Nr normy	PN-EN 10142+A1:1997			Arkusz
		półfabrykat (nr normy)				Arkuszy

Projektował	Nazwisko: Piotr Okniński	Podpis	Data: 17.08.2009	Nazwa rysunku: WWSO400
Rysował				
Sprawdził				
Zatwierdził				Nr zmiany

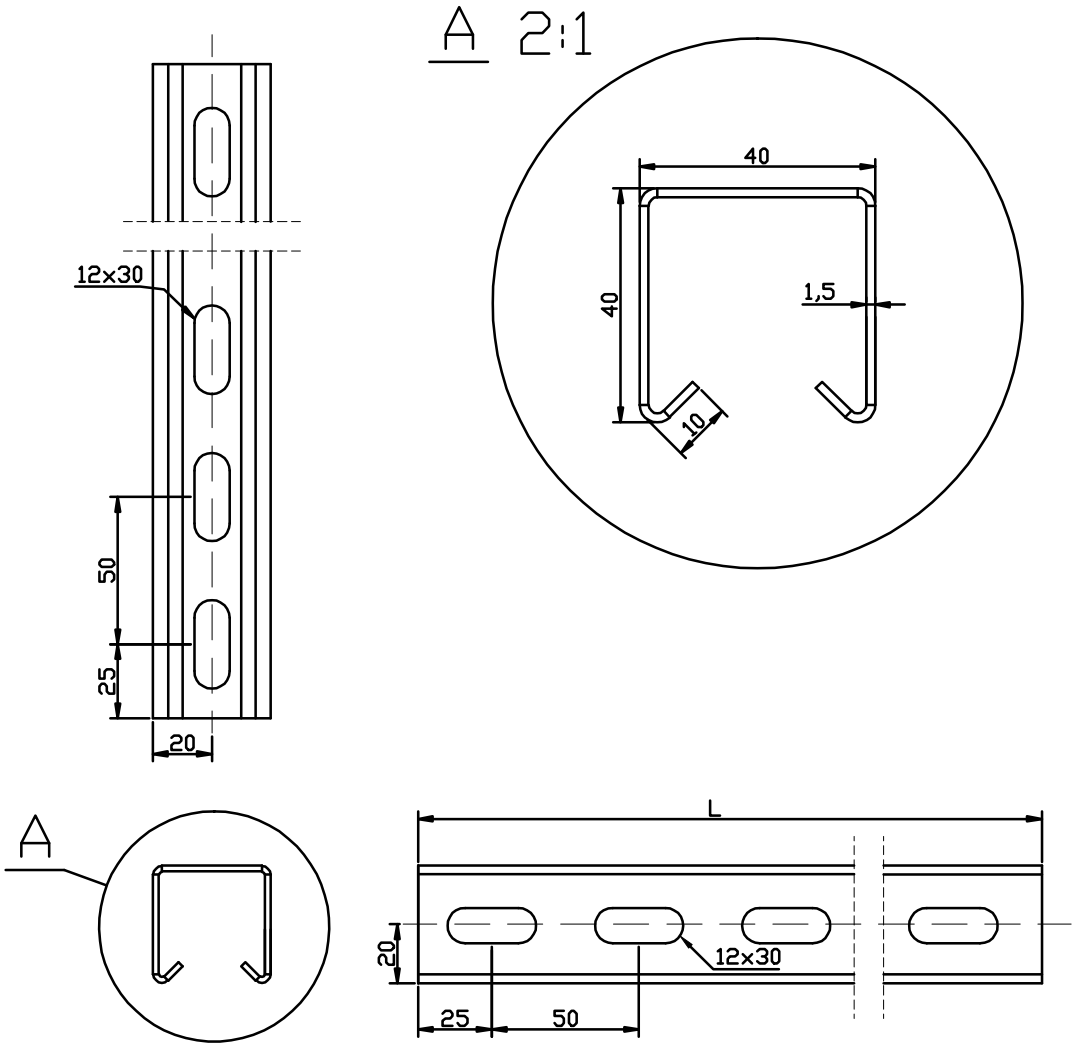
Profesjonalne Systemy Tras Kablowych

Nr rysunku





	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	----------	---	1:1	Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	J.Grochowski	Podpis	Data	--------	Nazwa rysunku		
Rysował		J.Grochowski			------	UPW□		
Sprawdził		J.Kliczek			------			
Zatwierdził		J.Kliczek			--------	Nr programu maszynowego ---		Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych						Nr rysunku 803300		



LP	Nazwa wyrobu	Symbol	Nr Katalogowy	L [mm]	Masa [kg]
5	Ceownik wzmocniony	CW□P40H40/ 2	804120	2000	3,50
4	Ceownik wzmocniony	CW□P40H40/05	804105	500	0,88
3	Ceownik wzmocniony	CW□P40H40/04	804104	400	0,70
2	Ceownik wzmocniony	CW□P40H40/03	804103	300	0,53
1	Ceownik wzmocniony	CW□P40H40/02	804102	200	0,35

	Dachytka wymiarów nietolerowanych	Grubość (mm) 1,5	Materiał	Gatunek	Blacha stal. cynk. met. Sendzimira	Masa [kg] ---	Podziałka 1:1	Format A4
				Nr normy	PN-EN 10327:2005			Arkusz --
				półfabrykat (nr normy)	-----			Arkuszy --

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	Jacek Grochowski		20.10.05	CW□P40H40/...N
Rysował	Jakub Rudak		20.02.08	
Sprawdził	Jacek Kliczek		20.02.08	
Zatwierdził	Jacek Kliczek		20.02.08	Nr zmiany

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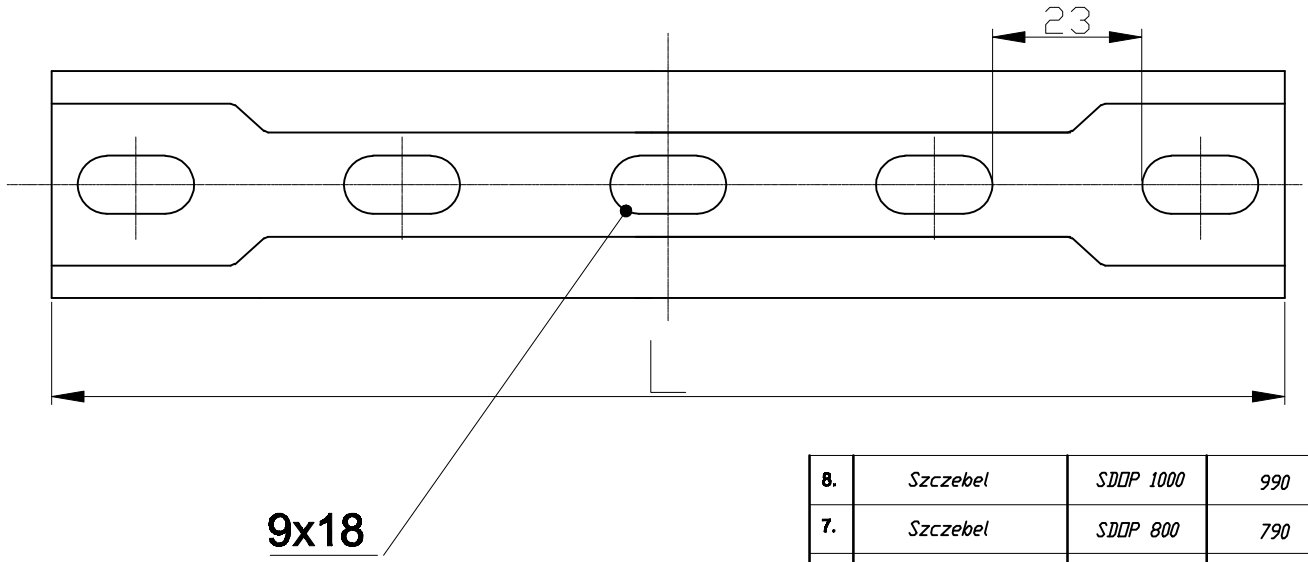
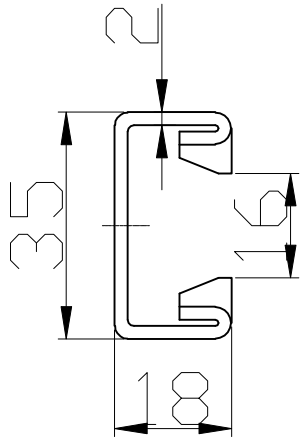
Nr rysunku 8041.....





L.p.	Nazwa wyrobu	Symbol	Długość L (mm)	Masa (kg)/szt.	Materiał	Nr katalogowy
8.	Szczebel	SDOP 1000	990	1,30		
7.	Szczebel	SDOP 800	790	1,04		
6.	Szczebel	SDOP 600	590	0,78		
5.	Szczebel	SDOP 500	490	0,65		
4.	Szczebel	SDOP 400	390	0,52		
3.	Szczebel	SDOP 300	290	0,39		
2.	Szczebel	SDOP 200	190	0,26		
1.	Szczebel	SDOP 100	90	0,13		

Dachyłka wymiarów nietolerowanych

Materiał: Gatunek ------ | Nr normy ------ | półfabrykat (nr normy) ------

Masa [kg] -----

Podziałka 1:1

Format A2 | Arkusz | Arkuszy

	Nazwisko	Podpis	Data
Projektował			
Rysował	P.Okniński		23.04.09
Sprawdził			
Zatwierdził			

Nazwa rysunku: SZCZEBEL SDOP

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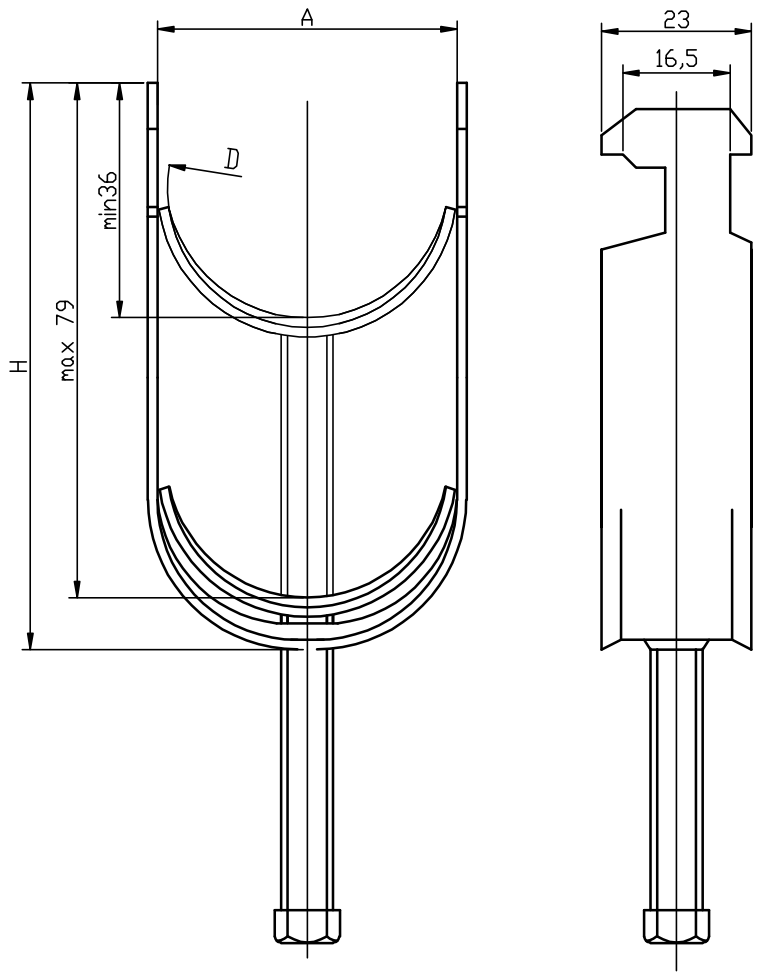
Nr katalogu: 8008....



UK□1/58-64	66	103	64
UK□1/46-52	54	97	52
UK□1/40-46	48	86	46
UK□1/34-40	42	78	40
UK□1/28-34	36	71	34
UK□1/22-28	30	61	28
UK□1/16-22	24	57	22
SYMBOL	A	H	ØD

Odchyłka wymiarów) nietolerowanych	Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
	Nr normy		-----	1:1	Arkusz 1
	półfabrykat (nr normy)				Arkuszy 1

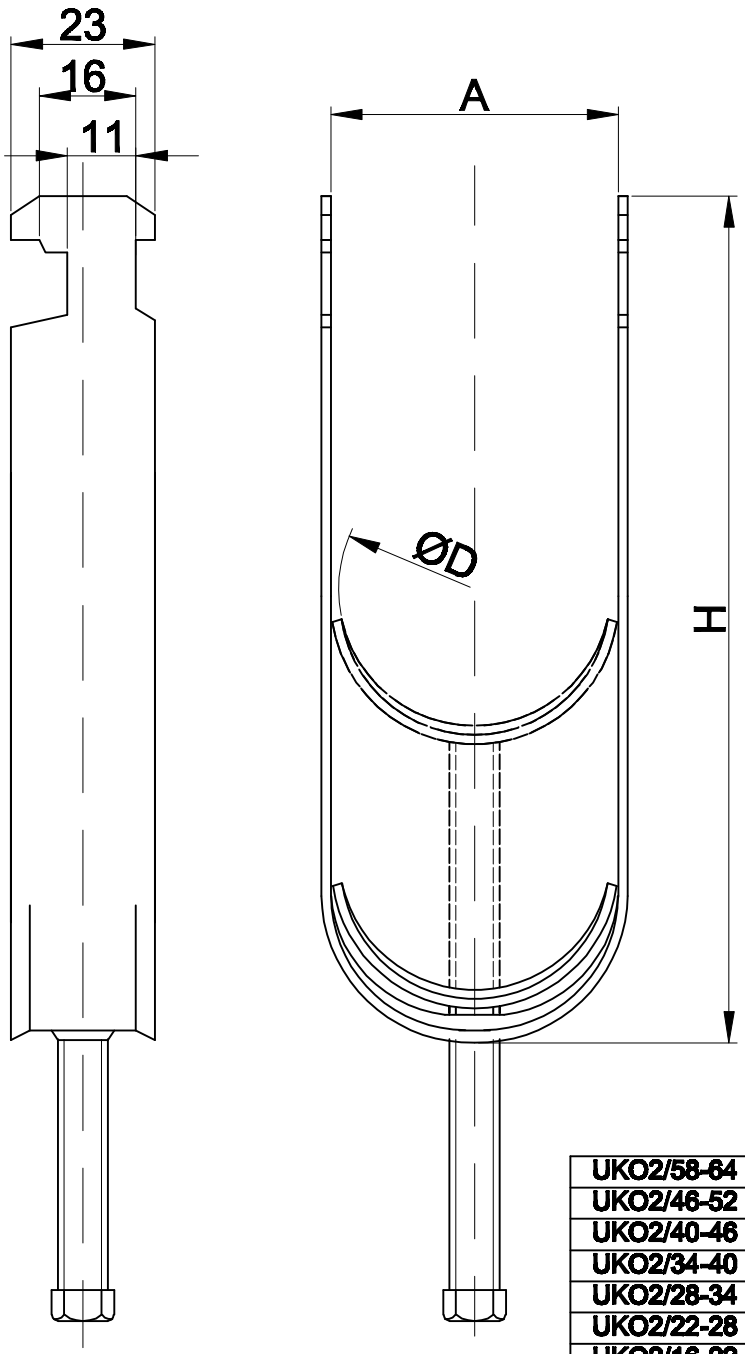
Projektował	T.Grudniewski		2004.12.29	Nazwa rysunku: UK□1/40-46
Rysował	J.Jasiński		2004.12.29	
Sprawdził	J.Kliczek		2004.12.29	
Zatwierdził	J.Kliczek		2004.12.29	Nr programu maszynowego: ---

Nazwisko | Podpis | Data

Nr rysunku

Nr zmiany

Profesjonalne Systemy Tras Kablowych



UKO2/58-64	66	163	64
UKO2/46-52	54	149	52
UKO2/40-46	48	132	46
UKO2/34-40	42	118	40
UKO2/28-34	36	105	34
UKO2/22-28	30	90	28
UKO2/16-22	24	80	22
SYMBOL	A	H	ØD

Odchyłka wymiarów nietolerowanych

Materiał: Gatunek; Nr normy; półfabrykat (nr normy)

Masa [kg]: —

Podziałka: 1:1

Format: A4

Arkusz: 1

Arkuszy: 1

Projektował

Rysował: G.Matuszewski

Sprawdził

Zatwierdził

Data: 2008.05.05

Nazwa rysunku: UKO2/...-...

Nr projektu maszynowego: —

Nr rysunku

Nr zmiany

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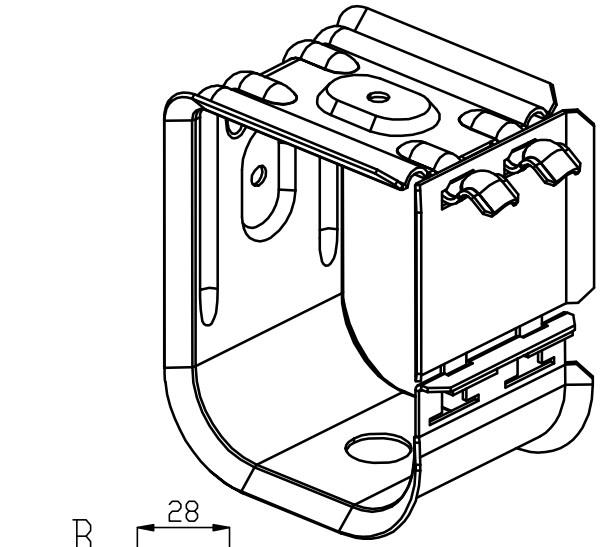
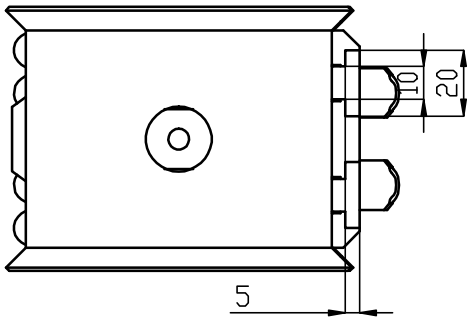
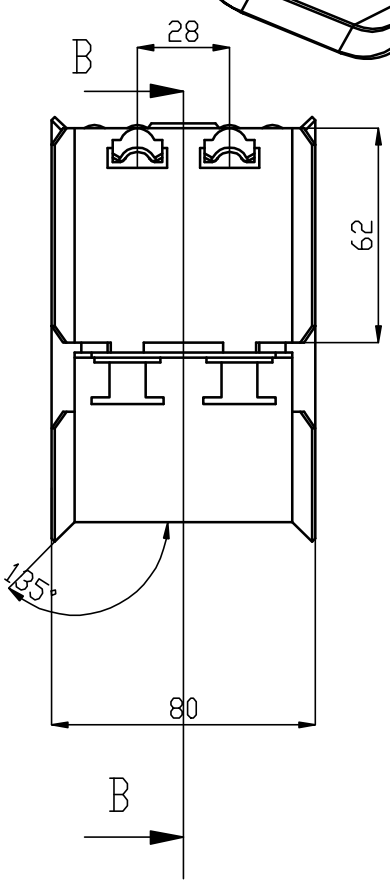
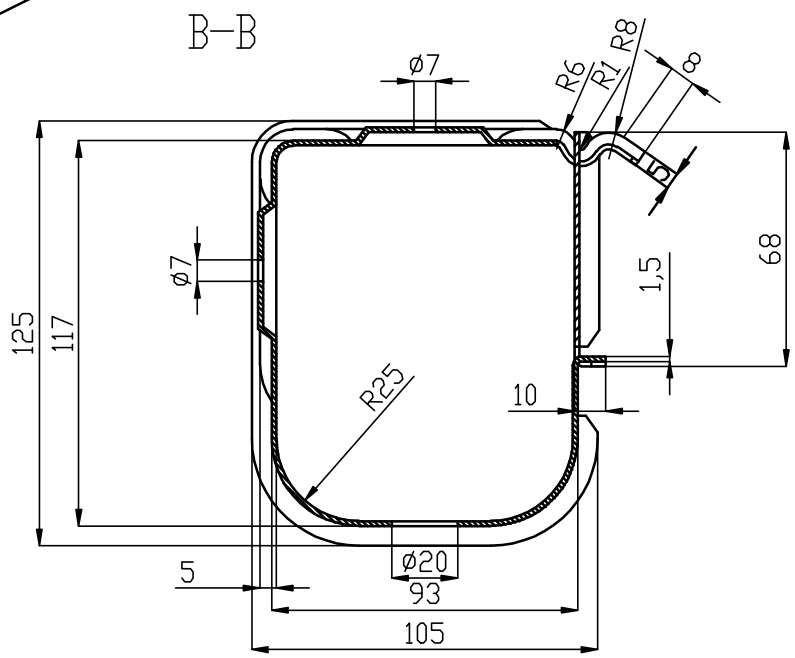
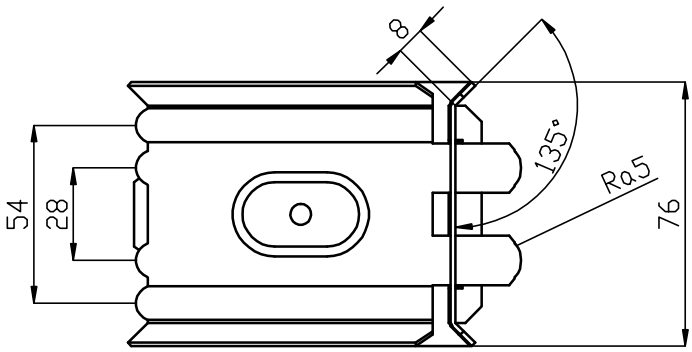








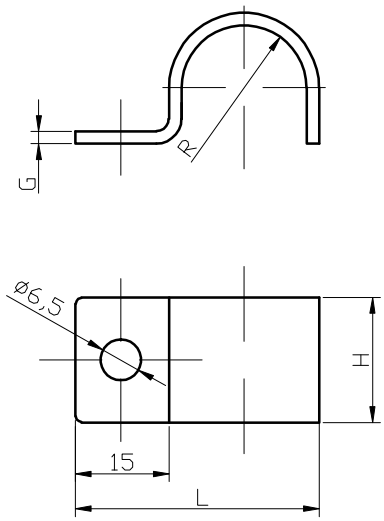


	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:2	Format A4
				Nr normy				Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1

Projektował	T.Grudniewski			Nazwa rysunku	Obejma zatrzaskowa OZO
Rysował	T.Grudniewski				
Sprawdził	J.Kliczek			Nr programu maszynowego	Nr zmiany
Zatwierdził	J.Kliczek			Nr rysunku	

Nazwisko | Podpis | Data

Profesjonalne Systemy Tras Kablowych



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

Odchyłka wymiarów nietolerowanych: ±0,5

Materiał: Gatunek; Nr normy: PN-EN 10327:2005; półfabrykat (nr normy): -----

Masa [kg]: ---

Podziałka: 1:1

Format: A4; Arkusz: --; Arkuszy: --

	Nazwisko	Podpis	Data
Projektował	Jacek Grochowski		20.10.05
Rysował	Jakub Rudak		20.02.08
Sprawdził	Jacek Kliczek		20.02.08
Zatwierdził	Jacek Kliczek		20.02.08

Nazwa rysunku: UDF 5-43

Nr zmiany:

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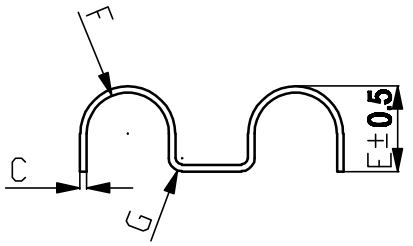
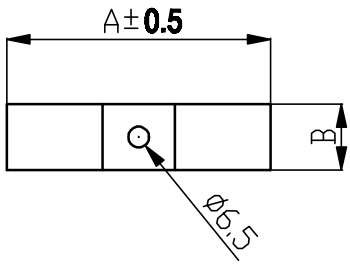
Nr rysunku: 4055.....





	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

Odchyłka wymiarów nietolerowanych

Materiał: Gatunek; Nr normy: PN-EN 10142 + A1 : 1997; półfabrykat (nr normy)

Masa [kg]

Podziałka: 1:1

Format: A4

Arkusz: 1

Arkuszy: 1

	Nazwisko	Podpis	Data
Projektował	J.GRZECHOWSKI		20.10.04
Rysował	J.GRZECHOWSKI		20.10.04
Sprawdził	T.WŁODARCZYK		20.10.04
Zatwierdził	J.KLICZEK		20.10.04

Nazwa rysunku: UEF

Nr programu maszynowego: ---

Nr zmiany

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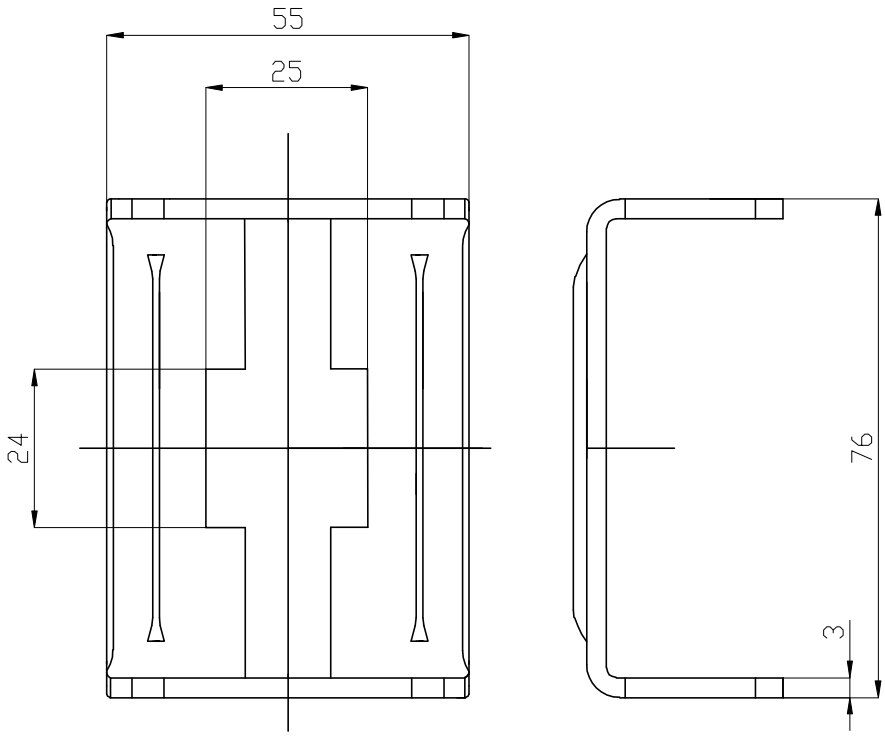
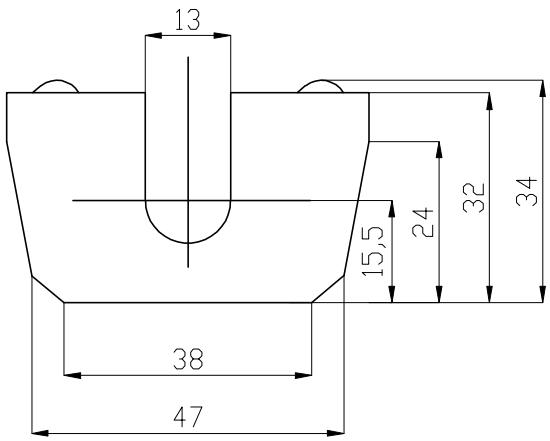
Nr rysunku: ---





	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:1	Format A4
				Nr normy				Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko: Piotr Okniński	Podpis	Data	2009-03-31	Nazwa rysunku: USO12			
Rysował	Piotr Okniński			2009-03-31				
Sprawdził					Nr programu maszynowego: ---			Nr zmiany
Zatwierdził					Nr rysunku			

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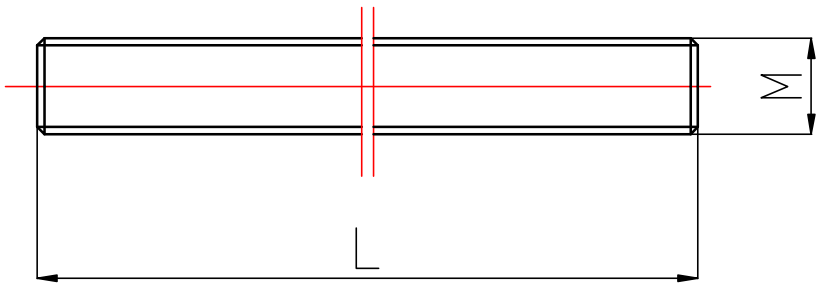

Symbol	L
PGM6/1	1000
PGM6/2	2000
PGM6/3	3000
PGM8/1	1000
PGM8/2	2000
PGM8/3	3000
PGM10/1	1000
PGM10/2	2000
PGM10/3	3000

Dachyłka wymiarów) nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		-----	1:1	Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	T.Grudniewski		2004.12.29	PGM10
Rysował	J.Jasiński		2004.12.29	
Sprawdził	J.Kliczek		2004.12.29	
Zatwierdził	J.Kliczek		2004.12.29	Nr programu maszynowego ---

Nr rysunku

Nr zmiany

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