FIRES
The Experts On Fire Safety

TEST REPORT FIRES-FR-217-12-AUNE

Cable bearing system and fireboxes BAKS with cables business KABTEK

Reg. No. 041/S-159

The Experts on Fire Safety

TEST REPORT

FIRES-FR-217-12-AUNE

Tested property:	Function in fire
	STN 92 0205: 2012
Test method:	(ZP-27/2008, DIN 4102-12: 1998-11)
Date of issue:	27. 09. 2012
Name of the product:	Cable bearing system and fireboxes BAKS with cables business KABTEK
Manufacturer:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05 - 480 Karczew, Poland - producer of construction
	KABLOTEK KABLO SAN. VE TIC. LTD. ŞTI, Alipaşa mevkii Sanayi 12., Sokak No:7, 34570 Silivri – İstanbul, Turkey - producer of cables
Sponsor:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland
Task No.:	PR-12-0352
Specimens received:	20. 09. 2012
Date of the test:	27. 09. 2012

Technician responsible for the technical side of this report: Bc. Dávid Šubert

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Test reports: 5 Copy No.: 2

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1. INTRODUCTION

This test report contains the results of test carried out by laboratory of FIRES, s.r.o. in Batizovce, accredited by SNAS for testing. Certificate of accreditation No.: S-159. The purpose of the test was to gain information for product classification.

Test of function in fire was carried out according to standard STN 92 0205: 2012. Similar standards and regulations for tests of function in fire are ZP-27/2008 PAVUS and DIN 4102-12: 1998-11.

Deviations from standard at the test according to ZP-27/2008: This test was carried out according to standard STN 92 0205: 2012 and meets also all requirements of ZP-27/2008 and test results can be directly used for classification of tested cables according to ZP-27/2008. There are no deviations identified in process and carrying out of test.

Deviations from standard at the test according to DIN 4102-12: 1998-11: This test was carried out according to standard STN 92 0205: 2012 and meets requirements of DIN 4102-12: 1998-11. Basic deviation in process and carrying out of test between these standards is in measuring and in control of temperature in the test furnace. According to STN 92 0205: 2012, plate thermometers according to EN 1363-1: 1999 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1:1999 are used. Measurement by plate thermometers acc. to EN 1363-1: 1999 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1: 1999. Therefore, it is possible to use results of test according to STN 92 025: 2012 for classification of tested cables according to DIN 4102-12: 1998-11, but not conversely. Identified deviation results in stricter course of test and it can lead to reduced classification of tested cables what is accepted as enhanced security in practice.

Representatives from the sponsor's side witnessing the test:

Mr. Jacek Kliczek	BAKS Kazimierz Sielski
Mr. Dariusz Gowronski	BAKS Kazimierz Sielski
Mr. István Kohajda	VLG Kábelkereskedelmi Kft.
Mr. László Balázs	VLG Kábelkereskedelmi Kft.

test directed by	Ing. Marek Gorlický
test carried out by	Bc. Dávid Šubert
operator	Miroslav Hudák

2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 004	Vertical test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 020	Driver Tecomat – Reliance (SW)	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	climatic conditions measuring
F 71 008, F 71 009	Transducer of differential pressure (–50 to + 150) Pa	pressure inside the test furnace

Identification number	Measuring equipment	Note
F 10 521 - F 10 528	Plate thermometers	temperature inside the test furnace, according to EN 1363-1
F 10 701	Sheathed thermocouple type K Ø 3 mm	ambient temperature
F 54 020	Digital calliper (0 to 200) mm	-
F 54 059	Racking meter	-
F 57 007	Digital stop-watch	-
F 96 015	Test signal panel	-

3. PREPARATION OF THE SPECIMENS

Testing laboratory didn't take off individual components of the specimens. 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 and mounting of cables and weights into the supporting system was carried out by workers of BAKS Kazimierz Sielski and VLG Kábelkereskedelmi Kft. under supervision of laboratory technician.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMENS STRUCTURE

Test specimen comprised from cable bearing system BAKS Kazimierz Sielski company – cable trays, cable ladders, cable clips and fireboxes with accessories (consoles, supports, hangers etc.) and power and communication halogen free cables of KABLOTEK KABLO company.

Cables

Used cables by test:	NHXH-O 4x1,5 FE180/E90	(18x)
	NHXH-O 4x50 FE180/E90	(16x)
	NHXCH-O 4x1,5/1,5 FE180/E90	(12x)
	NHXCH-O 4x50/25 FE180/E90	(12x)
	(N)HXH-O 3x1,5 FE180/E30	(6x)
	LIHCH 2x1,5 FE180/E90	(4x)
	JE-H(St)H…Bd FE180/E90 2x2x0,8	(16x)
	JE-H(St)H…Bd FE180/E30 1x2x0,8	(14x)

The length of cables was 5,5 m, 4 m from that was exposed to fire.

Power and communication halogen free cables were fixed in the trays, ladders and mesh trays by steel clips in the points of allowed bending radius.

Cable bearing systems were made of following constructions:

Suspension tracks No. 1, 2, 3 and 4

Tracks are made of three consoles (WPCO1000) which were fixed to ceiling by two dowels (PSRO M10x80) in spacing of 1200 mm. Two booms (WMCO400) were fixed to consoles by screws (SM M10x30). Holders (UPWO) were fixed at the end of booms with screws (SGN M8x14). Booms were fixed through these holders by threaded rods (PG M10) with washer and nuts M10 to ceiling holders (USOV) which were fixed to ceiling by dowels (PSRO M10x80).

Tracks No. 1 and 3:

Cable trays (KCOP300H60/B300, steel sheet thickness 1,5 mm) fixed together by two junctions (LPOP H60N) and screws (SGN M8x14) on sides and by junction (BLO400N) and screws (SGN M6x12) on the bottom. Trays were fixed to supports by screws (type SGN M6x12) and loaded with 10kg.m^{-1}.

Track No. 2 and 4:
Cable ladders (DGOP400H60/B400, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) fixed together by two junctions (LDOCH60N) and screws (SGN M8x14) on sides. Ladders were fixed to supports by junctions (ZMO) and by screws (SGN M8x14) and loaded with 20kg.m^{-1}.

Suspension tracks No. 5 and 6
Tracks are made of three console combined of two horizontal supports (type CWOP40H40/05) which are fixed to two threaded rods (type PGM10) by washers (type PP10) and nuts (type NSM10). Threaded rods were fixed to ceiling by dowels (type TRSOM10x40) in spacing of 1500 mm.

Track No. 5:
Cable trays (KCOP400H60/B400, steel sheet thickness 1,5 mm) fixed together by two junctions (LPOP H60N) and screws (SGN M8x14) on sides and by junction (BLO400N) and screws (SGN M6x12) on the bottom. Trays were fixed to supports by screws (type SGN M6x12) and loaded with 10kg.m^{-1}.

Track No. 6:
Cable ladders (DGOP400H60/B400, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) fixed together by two junctions (LDOCH60N) and screws (SGN M8x14) on sides. Ladders were fixed to supports by junctions (ZMO) and by screws (SGN M8x14) and loaded with 20kg.m^{-1}.

Suspension tracks No. 13
Track is made of three console combined of horizontal support (type CWOP40H22/05) which is fixed to two threaded rods (type PGM10) by washers (type PP10) and nuts (type NSM10). Threaded rods were fixed to ceiling by dowels (type TRSOM10x40) in spacing of 1500 mm.

Track No. 13:
Cable mesh tray (KDSO400H60/B400, steel wire ∅ 4,5 mm) fixed together by junctions (USSO). Trays were fixed to supports by junctions (ZSO) and loaded with 20kg.m^{-1}.

Suspension tracks No. 7 and 8
Tracks are made of three consoles (WPCO1000) which were fixed to ceiling by two dowels (PSRO M10x80) in spacing of 1500 mm. Two booms (WWSO400) were fixed to consoles by screws (SM M10x30). Holders (UPWO) were fixed at the end of booms with screws (SGN M8x14). Booms were fixed through these holders by threaded rods (PG M10) with washer and nuts M10 to ceiling holders (USOV) which were fixed to ceiling by dowels (PSRO M10x80).

Tracks No. 7:
Cable trays (KGOJ400H60/B400, steel sheet thickness 0,9 mm) fixed together by screws (SGN M6x12). Trays were fixed to supports by screws (type SGN M6x12) and loaded with 20kg.m^{-1}.

Tracks No. 7:
Cable trays (KGOL300H60/B300, steel sheet thickness 0,7 mm) fixed together by screws (SGN M6x12). Trays were fixed to supports by screws (type SGN M6x12) and loaded with 20kg.m^{-1}.

Track No. 9 and 12
Track was made of two fireboxes BAKS PMO1 and two fireboxes BAKS PMO2. Each firebox was fixed to ceiling by two dowels (type SRO M6x30). Cables which were connected to firebox were fixed by cable clips KSA to ceiling by dowels (type SRO M6x30) in spacing of 600 mm.

Track No. 10
Ceiling ledges (SDOP 600) were fixed to ceiling by dowels (SRO M6x30) in spacing of 600 mm. Cables were fixed to ledges by cable clips (UKO1).

Track No. 11
Track was made of ceiling clips KSA which were fixed to ceiling by dowels (type SRO M6x30) in spacing of 600 mm.

All bearing systems were from steel, galvanized according to the Sendzimir method PN-EN 10327:2005.

More detailed information about construction of specimens is shown in the drawings which form an integral part of this test report. Drawings were delivered by sponsor.

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

4.2 DESCRIPTION OF SPECIMENS FIXATION

The test specimens were 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's fixation into the test furnace is shown in drawing documentation and it was selected by the sponsor.

4.3 INSPECTION OF SPECIMENS

Before and after the function in fire test, conformity of drawings and test specimens was checked. Specimens corresponded to the drawings which are part of this test report. Inspection of specimens consisted of visual review of the test specimens, used materials as well as size verification (number and cross sections of conductors, thickness, measurements of cables and trays) and also the way of specimens fixation to supporting construction was subject of inspection.

4.4 CLIMATIC CONDITIONING OF SPECIMENS

Test specimens were stored in the hall of testing laboratory under the following climatic conditions:

Ambient air temperature [°C]

mean	18,1
standard deviation	2,0

Relative air humidity [%]

mean	49,1
standard deviation	7,2

The humidity equilibrium state of test specimens was not determined. Test specimens did not comprise hygroscopic materials.

5. CARRYING OUT OF THE TEST

5.1 TEST GENERALLY

The test was carried out in horizontal test furnace with dimensions of (4000 x 3000 x 2750) mm (length x width x height).

5.2 CONDITIONS OF THE TEST

Conditions in the test furnace (temperature – standard temperature/time curve, pressure, content of O_2) as well as in the testing room (ambient temperature) corresponded to EN 1363-1 during the test. Detailed information is part of this test report, or in Quality records of the testing laboratory.

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

Date of the test	Relative air humidity [%]	Ambient air temperature [°C]
27. 09. 2012	46,7	21,6

5.3 RESULTS OF THE TEST

Measured values are stated in this test report.

6. CLOSING

Evaluation of the test:

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
1	cable NHXCH-O 4x50/25 FE180/E90	8	90 minutes no failure / interruption
2	cable NHXCH-O 4x50/25 FE180/E90		90 minutes no failure / interruption
3	cable NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
4	cable NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
5	cable NHXH-O 4x50 FE180/E90	7	90 minutes no failure / interruption
6	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
7	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
8	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
9	cable NHXCH-O 4x1,5/1,5 FE180/E90	13	90 minutes no failure / interruption
10	cable NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
11	cable NHXCH-O 4x50/25 FE180/E90		90 minutes no failure / interruption
12	cable NHXCH-O 4x50/25 FE180/E90		90 minutes no failure / interruption
13	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
14	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
15	cable NHXH-O 4x1,5 FE180/E90		89 minutes
16	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
17	cable NHXH-O 4x50 FE180/E90	6	90 minutes no failure / interruption
18	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
19	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
20	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
21	cable NHXH-O 4x50 FE180/E90	5	90 minutes no failure / interruption
22	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
23	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
24	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
25	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)	11	26 minutes
26	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)		26 minutes
27	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
28	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
29	cable NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
30	cable NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
31	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
32	cable NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
33	2 cables NHXCH-O 4x50/25 FE180/E90		90 minutes no failure / interruption
34	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)	10	39 minutes
35	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)		39 minutes
36	2 cables NHXH-O 4x50 FE180/E90	4	90 minutes no failure / interruption
37	2 cables NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
38	2 cables NHXH-O 4x50 FE180/E90	3	90 minutes no failure / interruption
39	2 cables NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
40	2 cables NHXH-O 4x1,5 FE180/E90	10	90 minutes no failure / interruption
41	2 cables NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
42	2 cables NHXH-O 4x50 FE180/E90		90 minutes no failure / interruption
43	2 cables NHXCH-O 4x50/25 FE180/E90		90 minutes no failure / interruption

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
44	2 cables NHXCH-O 4x50/25 FE180/E90	2	90 minutes no failure / interruption
45	2 cables NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
46	NHXH-O 3x1,5 FE180/E30 (TEST)		46 minutes
47	NHXH-O 3x1,5 FE180/E30 (TEST)		90 minutes no failure / interruption
48	2 cables NHXCH-O 4x50/25 FE180/E90	1	90 minutes no failure / interruption
49	2 cables NHXCH-O 4x1,5/1,5 FE180/E90		90 minutes no failure / interruption
50	cable NHXH-O 4x1,5 FE180/E90	9	90 minutes no failure / interruption
51	cable NHXH-O 4x1,5 FE180/E90		90 minutes no failure / interruption
52A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8	8	30 minutes
52B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		29 minutes
53	2 cables JE-H(St)H...Bd FE180/E90 2x2x0,8	7	90 minutes no failure / interruption
54A	cable LIHCH FE180/E90 2x1,5		90 minutes no failure / interruption
54B	cable LIHCH FE180/E90 2x1,5		90 minutes no failure / interruption
55	cable JE-H(St)H...Bd FE180/E90 2x2x0,8	12	90 minutes no failure / interruption
56	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
57	cable JE-H(St)H...Bd FE180/E90 2x2x0,8	6	90 minutes no failure / interruption
58	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
59A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		46 minutes
59B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		45 minutes
60	cable JE-H(St)H...Bd FE180/E90 2x2x0,8	5	90 minutes no failure / interruption
61	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
62A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		36 minutes
62B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		42 minutes
63A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8	11	30 minutes
63B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		30 minutes
64	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
65	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
66	cable JE-H(St)H...Bd FE180/E90 2x2x0,8	4	90 minutes no failure / interruption
67	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
68A	cable LIHCH FE180/E90 2x1,5		90 minutes no failure / interruption
68B	cable LIHCH FE180/E90 2x1,5		90 minutes no failure / interruption
69	cable JE-H(St)H...Bd FE180/E90 2x2x0,8	3	90 minutes no failure / interruption
70	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
71A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8	10	39 minutes
71B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		39 minutes
72	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
73	cable JE-H(St)H...Bd FE180/E90 2x2x0,8		90 minutes no failure / interruption
74A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8	2	66 minutes
74B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		74 minutes
75A	cable JE-H(St)H...Bd FE180/E30 1x2x0,8	1	90 minutes no failure / interruption
75B	cable JE-H(St)H...Bd FE180/E30 1x2x0,8		90 minutes no failure / interruption

The fire test was discontinued in 94th minute at the request of test sponsor.

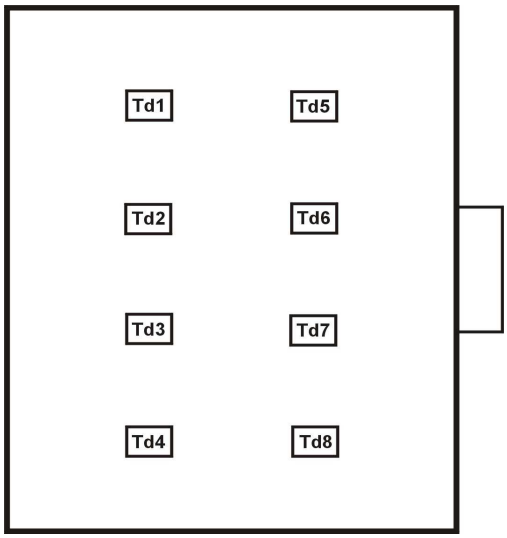
Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S75 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.
Circuit breakers with rating 3 A were used.

Measured values inside the test furnace

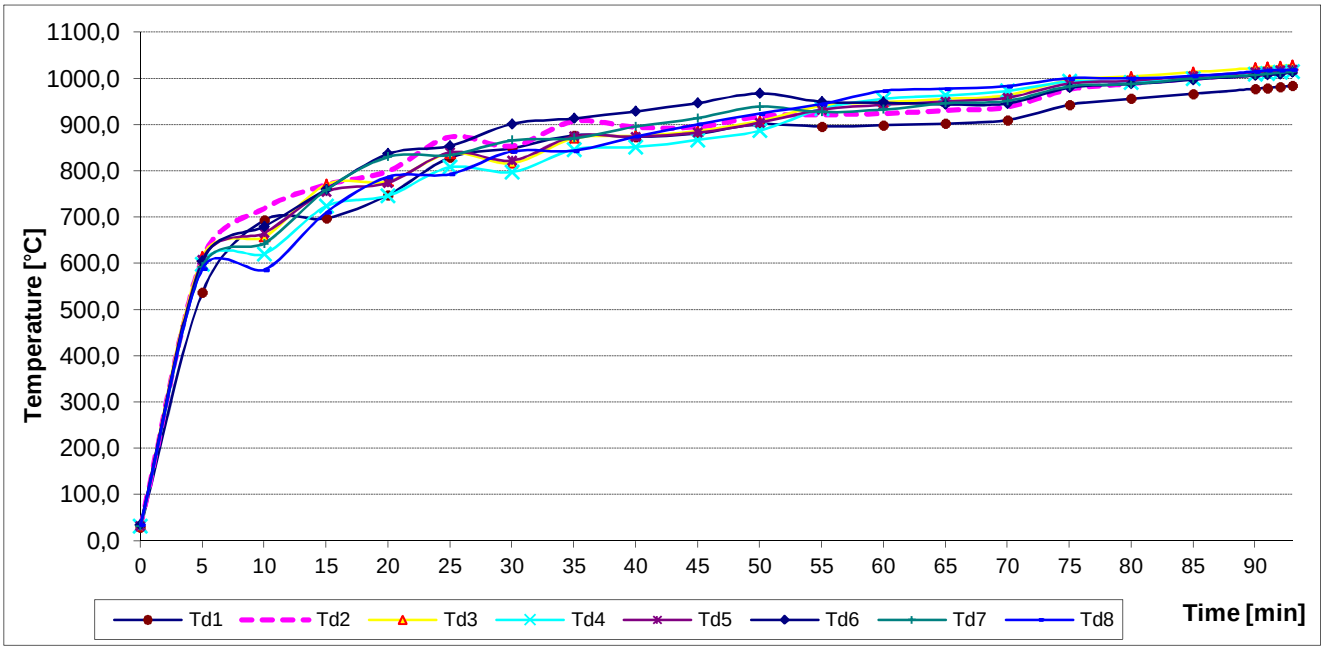
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	29,2	31,9	32,0	32,2	32,0	35,3	31,6	34,0	32,3	20,0	24,7	0,0	18,6
5	537,5	612,7	614,8	598,1	608,5	605,1	592,9	588,5	594,8	576,0	24,7	-12,0	17,6
10	693,8	719,6	657,5	620,8	666,0	680,1	643,5	586,7	658,5	678,0	24,7	-6,4	17,7
15	698,2	770,6	771,3	724,0	755,3	760,7	759,2	710,7	743,8	739,0	24,9	-4,1	19,9
20	748,7	800,3	778,0	746,9	775,1	837,6	830,9	787,5	788,1	781,0	24,9	-2,6	18,1
25	829,4	874,1	838,4	808,4	840,3	854,7	835,1	793,6	834,3	815,0	25,2	-1,6	17,5
30	849,4	854,3	817,6	798,2	823,4	902,3	866,8	842,8	844,3	842,0	25,2	-1,1	17,8
35	877,3	908,0	871,2	847,0	875,4	914,0	871,0	844,1	876,0	865,0	25,3	-0,8	18,5
40	874,5	895,1	876,4	852,0	874,5	929,4	896,5	874,9	884,2	885,0	25,4	-0,5	17,3
45	881,4	895,5	887,1	867,5	883,4	947,5	915,0	901,4	897,3	902,0	25,4	-0,5	19,3
50	901,5	918,6	908,7	887,8	905,0	968,0	939,3	924,6	919,2	918,0	25,4	-0,5	18,2
55	896,5	922,2	941,6	935,0	932,9	950,1	928,2	945,3	931,5	932,0	25,4	-0,4	19,7
60	899,2	924,5	950,0	956,3	943,6	948,5	933,3	973,8	941,2	945,0	25,5	-0,4	17,4
65	903,0	931,6	956,0	963,9	950,5	944,7	947,3	978,1	946,9	957,0	25,3	-0,5	18,6
70	910,5	938,8	964,3	973,5	958,9	946,6	951,9	984,0	953,6	968,0	25,2	-0,5	17,2
75	943,6	976,9	997,5	994,4	989,6	981,1	983,6	1000,9	983,5	979,0	25,2	-0,5	17,3
80	956,9	989,6	1004,9	992,4	995,6	988,5	988,6	1000,7	989,7	988,0	25,1	-0,5	19,7
85	967,5	1001,2	1014,3	1000,1	1005,2	997,9	1000,3	1006,2	999,1	997,0	25,2	-0,4	18,6
90	978,4	1009,2	1023,3	1009,6	1014,0	1007,0	1008,0	1015,6	1008,1	1006,0	25,1	-0,4	18,8
91	980,1	1010,9	1025,2	1011,6	1015,9	1009,2	1010,8	1018,0	1010,2	1008,0	25,0	-0,4	17,3
92	982,4	1012,3	1027,0	1013,5	1017,6	1010,2	1013,0	1018,6	1011,8	1009,0	25,0	-0,4	18,6
93	984,8	1014,6	1029,5	1016,1	1020,1	1014,4	1014,8	1019,5	1014,2	1011,0	25,0	-0,4	19,1

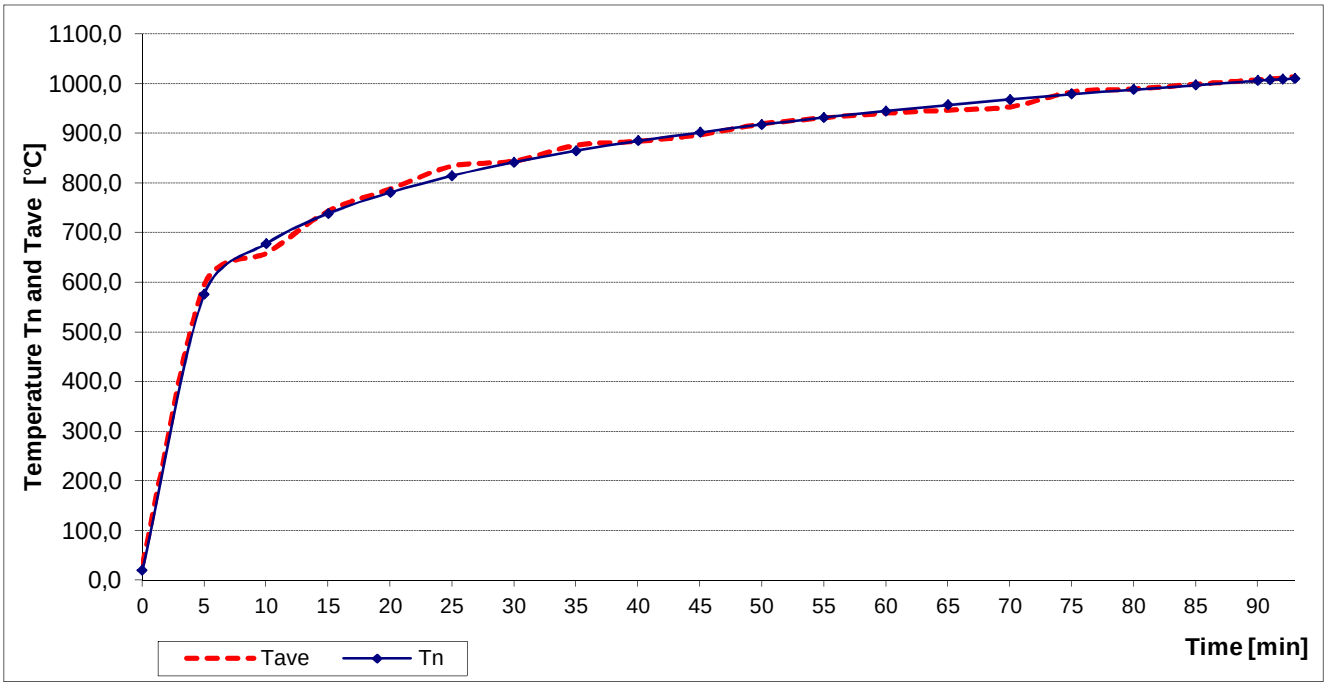
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

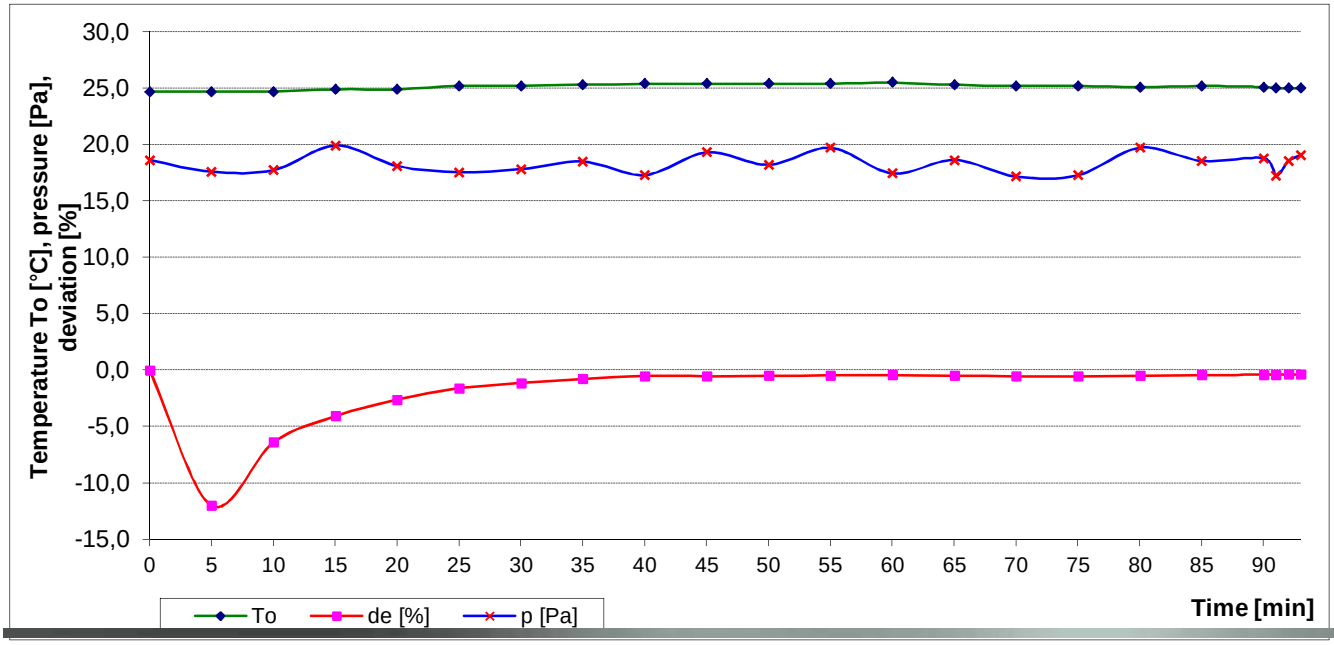
Layout of measuring points inside the test furnace:



Measured values inside the test furnace /graph







Measured time of tested specimens from S1 to S10 - power cables

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
S9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption
S10	37-L1	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption

Specimen No.	Cables
1	cable NHXCH-O 4x50/25 FE180/E90
2	cable NHXCH-O 4x50/25 FE180/E90
3	cable NHXCH-O 4x1,5/1,5 FE180/E90
4	cable NHXCH-O 4x1,5/1,5 FE180/E90
5	cable NHXH-O 4x50 FE180/E90
6	cable NHXH-O 4x50 FE180/E90
7	cable NHXH-O 4x1,5 FE180/E90
8	cable NHXH-O 4x1,5 FE180/E90
9	cable NHXCH-O 4x1,5/1,5 FE180/E90
10	cable NHXCH-O 4x1,5/1,5 FE180/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 S11 to S20 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S11	41-L1	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S12	45-L1	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
S15	57-L1	x
	58-L2	89:28
	59-L3	x
	60-PEN	x
S16	61-L1	no failure / interruption
	62-L2	no failure / interruption
	63-L3	no failure / interruption
	64-PEN	no failure / interruption
S17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
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	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption

Specimen No.	Cables
11	cable NHXCH-O 4x50/25 FE180/E90
12	cable NHXCH-O 4x50/25 FE180/E90
13	cable NHXH-O 4x50 FE180/E90
14	cable NHXH-O 4x50 FE180/E90
15	cable NHXH-O 4x1,5 FE180/E90
16	cable NHXH-O 4x1,5 FE180/E90
17	cable NHXH-O 4x50 FE180/E90
18	cable NHXH-O 4x50 FE180/E90
19	cable NHXH-O 4x1,5 FE180/E90
20	cable NHXH-O 4x1,5 FE180/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 S21 to S30 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
S23	89-L1	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
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	no failure / interruption
	106-L2	no failure / interruption
	107-L3	no failure / interruption
	108-PEN	no failure / interruption
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	no failure / interruption
	118-L2	no failure / interruption
	119-L3	no failure / interruption
	120-PEN	no failure / interruption

Specimen No.	Cables
21	cable NHXH-O 4x50 FE180/E90
22	cable NHXH-O 4x50 FE180/E90
23	cable NHXH-O 4x1,5 FE180/E90
24	cable NHXH-O 4x1,5 FE180/E90
25	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)
26	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)
27	cable NHXH-O 4x1,5 FE180/E90
28	cable NHXH-O 4x1,5 FE180/E90
29	cable NHXCH-O 4x1,5/1,5 FE180/E90
30	cable NHXCH-O 4x1,5/1,5 FE180/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 S31 to S40 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
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
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	no failure / interruption
	142-L2	no failure / interruption
	143-L3	no failure / interruption
	144-PEN	no failure / interruption
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
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

Specimen No.	Cables
31	cable NHXH-O 4x50 FE180/E90
32	cable NHXH-O 4x50 FE180/E90
33	2 cables NHXCH-O 4x50/25 FE180/E90
34	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)
35	cable (N)HXH-O 3x1,5 FE180/E90 (TEST)
36	2 cables NHXH-O 4x50 FE180/E90
37	2 cables NHXH-O 4x1,5 FE180/E90
38	2 cables NHXH-O 4x50 FE180/E90
39	2 cables NHXH-O 4x1,5 FE180/E90
40	2 cables NHXH-O 4x1,5 FE180/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 S41 to S51 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
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
S43	169-L1	no failure / interruption
	170-L2	no failure / interruption
	171-L3	no failure / interruption
	172-PEN	no failure / interruption
S44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption
S45	177-L1	no failure / interruption
	178-L2	no failure / interruption
	179-L3	no failure / interruption
	180-PEN	no failure / interruption
S46	181-L1	x
	182-L2	46:33
	183-L3	x
	184-PEN	x
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	201-L1	no failure / interruption
	202-L2	no failure / interruption
	203-L3	no failure / interruption
	204-PEN	no failure / interruption

Specimen No.	Cables
41, 45, 49	2 cable NHXCH-O 4x1,5/1,5 FE180/E90
42	2 cables NHXH-O 4x50 FE180/E90
43, 44, 48	2 cables NHXCH-O 4x50/25 FE180/E90
46, 47	NHXH-O 3x1,5 FE180/E30 (TEST)
50	cable NHXH-O 4x1,5 FE180/E90
51	cable NHXH-O 4x1,5 FE180/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 specimen S52 to S61 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	30:20
	210-PEN	x
S52B	211-L	29:48
	212-PEN	x
S53	213-L	no failure / interruption
	214-PEN	no failure / interruption
	215-L	no failure / interruption
	216-PEN	no failure / interruption
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S54B	219-L	no failure / interruption
	220-PEN	no failure / interruption
S55	221-L	no failure / interruption
	222-PEN	no failure / interruption
	223-L	no failure / interruption
	224-PEN	no failure / interruption
S56	225-L	no failure / interruption
	226-PEN	no failure / interruption
	227-L	no failure / interruption
	228-PEN	no failure / interruption
S57	229-L	no failure / interruption
	230-PEN	no failure / interruption
	231-L	no failure / interruption
	232-PEN	no failure / interruption
S58	233-L	no failure / interruption
	234-PEN	no failure / interruption
	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59A	237-L	46:25
	238-PEN	x
S59B	239-L	45:27
	240-PEN	x
S60	241-L	no failure / interruption
	242-PEN	no failure / interruption
	243-L	no failure / interruption
	244-PEN	no failure / interruption
S61	245-L	no failure / interruption
	246-PEN	no failure / interruption
	247-L	no failure / interruption
	248-PEN	no failure / interruption

Specimen No.	Cables
52	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8
53	2 cables JE-H(St)H...Bd FE180/E90 2x2x0,8
54	2 cables LIHCH FE180/E90 2x1,5
55	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
56	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
57	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
58	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
59	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8
60	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
61	cable JE-H(St)H...Bd FE180/E90 2x2x0,8

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 S62 to S71 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S62A	249-L	36:01
	250-PEN	x
S62B	251-L	42:49
	252-PEN	x
S63A	253-L	30:25
	254-PEN	x
S63B	255-L	30:31
	256-PEN	x
S64	257-L	no failure / interruption
	258-PEN	no failure / interruption
	259-L	no failure / interruption
	260-PEN	no failure / interruption
S65	261-L	no failure / interruption
	262-PEN	no failure / interruption
	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66	265-L	no failure / interruption
	266-PEN	no failure / interruption
	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67	269-L	no failure / interruption
	270-PEN	no failure / interruption
	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S68B	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69	273-L	no failure / interruption
	274-PEN	no failure / interruption
	275-L	no failure / interruption
	276-PEN	no failure / interruption
S70	281-L	no failure / interruption
	282-PEN	no failure / interruption
	283-L	no failure / interruption
	284-PEN	no failure / interruption
S71A	285-L	39:38
	286-PEN	x
S71B	287-L	39:38
	288-PEN	x

Specimen No.	Cables
62	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8
63	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8
64	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
65	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
66	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
67	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
68	2 cables LIHCH FE180/E90 2x1,5
69	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
70	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
71	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8

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 S72 to S75 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S72	289-L	no failure / interruption
	290-PEN	no failure / interruption
	291-L	no failure / interruption
	292-PEN	no failure / interruption
S73	293-L	no failure / interruption
	294-PEN	no failure / interruption
	295-L	no failure / interruption
	296-PEN	no failure / interruption
S74A	297-L	66:01
	298-PEN	x
S74B	299-L	74:06
	300-PEN	x
S75A	301-L	no failure / interruption
	302-PEN	no failure / interruption
S75B	303-L	no failure / interruption
	304-PEN	no failure / interruption

Specimen No.	Cables
72	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
73	cable JE-H(St)H...Bd FE180/E90 2x2x0,8
74	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8
75	2 cables JE-H(St)H...Bd FE180/E30 1x2x0,8

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.

PHOTOS

Photo taken before the test.

Photo taken before the test.

Photo taken before the test.

PHOTOS

Photo taken before the test.

Photo taken before the test.

Photo taken before the test.

PHOTOS

Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

PHOTOS

Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

NHXCH FE180 E90
SCREENED POWER CABLE

Applications

These cables can be used as power supply and command cable where in case of fire human life and material assets are to be protected with FE 180 E90 speciality.

Technical data

- **Standard**
  Acc. to DIN VDE 0266
- **Rated voltage Uo/U**
  600/1000 V AC
- **Temperature Range (fixed)**
  -30 °C up to +70 °C
- **Max. temperature at conductor**
  +90 °C
- **Test voltage**
  Core/core 4000 V
- **Minimum bending radius**
  Fixed installation approx. 15 x cable Ø

Cable structure

• Conductor	Bare copper, solid or stranded acc. to IEC 60228 cl. 1-2
• Taping	Mica tape over conductors
• Insulation	Special cross-linked compound
• Core Identification	1 x Black 2 x Blue + Brown 3 G Blue + Brown + Yellow/Green 3 x Black + Grey + Brown 4 G Brown + Black + Grey + Yellow/Green 4 x Brown + Black + Grey + Blue 5 G Blue + Brown + Black + Grey + Yellow/Green 5 x Blue + Brown + Black + Grey + Black 6 G and above Black with white numbered + green/yellow core
• Stranding	Cores stranded in layers with optimal lay-length under glass fibre tape
• Inner Sheath	LSZH compound
• Concentric Screen	Concentric conductor of copper tape and copper wires
• Outer Sheath	LSZH compound
• Colour	RAL2003 Orange

Additional Properties

- Insulation integrity acc. to IEC 60331-23
- Circuit integrity with shock according to EN 50200
- ROHS Compliant

in case of Fire:

• Flame Retardant	acc. to IEC 60332-1 -2
• Flame Retardant	acc. to IEC 60332-3-24
• Halogen Free	acc. to DIN EN 50267-2-2
• Low Smoke	acc. to IEC 61034-2
• Low Corrosivity of gases	acc. to IEC 60754-2

We confirm that all products listed in this Data Sheet are manufactured in compliance with the EU Directive 2002/95/EG (RoHS).

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NHXH FE180 E90
POWER CABLE

Applications

These cables can be used as power supply and command cable where in case of fire human life and material assets are to be protected with FE 180 E90 speciality.

Technical data

- **Standard**
  Acc. to DIN VDE 0266
- **Rated voltage Uo/U**
  600/1000 V AC
- **Temperature Range (fixed)**
  -30 °C up to +70 °C
- **Max. temperature at conductor**
  +90 °C
- **Test voltage**
  Core/core 4000 V
- **Minimum bending radius**
  Fixed installation approx. 15 x cable Ø

Cable structure

• Conductor	Bare copper, solid or stranded acc. to IEC 60228 cl. 1-2
• Taping	Mica tape over conductors
• Insulation	Special cross-linked compound
• Core Identification	1 x Black 2 x Blue + Brown 3 G Blue + Brown + Yellow/Green 3 x Black + Grey + Brown 4 G Brown + Black + Grey + Yellow/Green 4 x Brown + Black + Grey + Blue 5 G Blue + Brown + Black + Grey + Yellow/Green 5 x Blue + Brown + Black + Grey + Black 6 G and above Black with white numbered + green/yellow core
• Stranding	Cores stranded in layers with optimal lay-length under glass fibre tape
• Inner Sheath	LSZH compound
• Outer Sheath	LSZH compound
• Colour	RAL2003 Orange

Additional Properties

- Insulation integrity acc. to IEC 60331-23
- Circuit integrity with shock according to EN 50200
- ROHS Compliant

in case of Fire:

• Flame Retardant	acc. to IEC 60332-1 -2
• Flame Retardant	acc. to IEC 60332-3-24
• Halogen Free	acc. to DIN EN 50267-2-2
• Low Smoke	acc. to IEC 61034-2
• Low Corrosivity of gases	acc. to IEC 60754-2

We confirm that all products listed in this Data Sheet are manufactured in compliance with the EU Directive 2002/95/EG (RoHS).

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NHXH FE180 E30
POWER CABLE

Applications

These cables can be used as power supply and command cable where in case of fire human life and material assets are to be protected with FE 180 E30 speciality.

Technical data

- **Standard**
  Acc. to DIN VDE 0266
- **Rated voltage Uo/U**
  600/1000 V AC
- **Temperature Range (fixed)**
  -30 °C up to +70 °C
- **Max. temperature at conductor**
  +90 °C
- **Test voltage**
  Core/core 4000 V
- **Minimum bending radius**
  Fixed installation approx. 15 x cable Ø

Cable structure

• Conductor	Bare copper, solid or stranded acc. to IEC 60228 cl. 1-2
• Insulation	Core insulation of mica tape and cross-linked polyolefin compound or cross-linked special compound
• Core Identification	1 x Black 2 x Blue + Brown 3 G Blue + Brown + Yellow/Green 3 x Black + Grey + Brown 4 G Brown + Black + Grey + Yellow/Green 4 x Brown + Black + Grey + Blue 5 G Blue + Brown + Black + Grey + Yellow/Green 5 x Blue + Brown + Black + Grey + Black 6 G and above Black with white numbered + green/yellow core
• Stranding	Cores stranded in layers with optimal lay-length
• Inner Sheath	LSZH compound
• Outer Sheath	LSZH compound
• Colour	RAL2003 Orange

Additional Properties

- Insulation integrity acc. to IEC 60331-23
- Circuit integrity with shock according to EN 50200
- ROHS Compliant

in case of Fire:

• Flame Retardant	acc. to IEC 60332-1 -2
• Flame Retardant	acc. to IEC 60332-3-24
• Halogen Free	acc. to DIN EN 50267-2-2
• Low Smoke	acc. to IEC 61034-2
• Low Corrosivity of gases	acc. to IEC 60754-2

We confirm that all products listed in this Data Sheet are manufactured in compliance with the EU Directive 2002/95/EG (RoHS).

KABTEK KABLO INS. TIC. ve SAN. LTD. STI.
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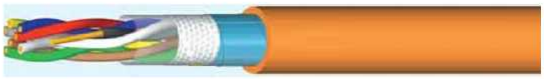
KABTEK

JE-H(ST)H…Bd
FE180 E90
HF SECURITY CABLE



Applications

Halogen-free, flame resistant installation cables are mostly used for telecommunication. The electrostatic screening considerably reduces effect of outer electrical interferences. In case of fire no flame propagation and low smoke density. These flame-resistant cables are used for fixed installation in all locations where a special protection against fire and fire damage to human life and equipment is necessary such as in industry complexes, power stations, public buildings, hotels, airports, subways, theatres, hospitals etc.

Technical data

- **Standard**
  With reference to DIN VDE 0815
- **Rated voltage**
  225 V
- **Temperature Range**
  Flexing -5 °C up to +70 °C
  Fixed -30 °C up tp +70 °C
- **Test voltage (core/core – core/screen)**
  500 V – 2000 V
- **Capacitance**
  < 120 nF/km
- **Insulation resistance**
  > 100 MΩ x km
- **Minimum bending radius**
  Moved application approx. 15 x cable Ø
  Fixed installation approx. 10 x cable Ø

Cable structure

• Conductor	Bare copper, solid acc. to IEC 60228 cl. 1
• Insulation	Core insulation of mica tape and cross-linked special compound
• Core Identification	Acc. to VDE 0815
• Stranding	Conductors twisted to pairs, each 4 pairs consist to unit, several units stranded to layers
• Wrapping	Glass fibre tape
• Screen	Shielding with aluminum-laminated polyester tape and solid tinned copper drain wire
• Outer Sheath	Halogen-free compound acc. to EN 50290-2-27
• Colour	RAL7001 Grey, RAL3000 Red or RAL2003 Orange

Additional Properties

- ROHS Compliant
- Insulation integrity acc. to IEC 60331-23
- Circuit integrity with shock according to EN 50200

in case of Fire:

• Flame Retardant	acc. to IEC 60332-1 -2
• Flame Retardant	acc. to IEC 60332-3-24
• Halogen Free	acc. to DIN EN 50267-2-2
• Low Smoke	acc. to IEC 61034-2
• Low Corrosivity of gases	acc. to IEC 60754-2

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JE-H(ST)H…Bd
FE180 E30
HF SECURITY CABLE

Applications

Halogen-free, flame resistant installation cables are mostly used for telecommunication. The electrostatic screening considerably reduces effect of outer electrical interferences. In case of fire no flame propagation and low smoke density. These flame-resistant cables are used for fixed installation in all locations where a special protection against fire and fire damage to human life and equipment is necessary such as in industry complexes, power stations, public buildings, hotels, airports, subways, theatres, hospitals etc.

Technical data

- **Standard**
  With reference to DIN VDE 0815
- **Rated voltage**
  225 V
- **Temperature Range**
  Flexing -5 °C up to +70 °C
  Fixed -30 °C up tp +70 °C
- **Test voltage (core/core – core/screen)**
  500 V – 2000 V
- **Capacitance**
  < 120 nF/km
- **Insulation resistance**
  > 100 MΩ x km
- **Minimum bending radius**
  Moved application approx. 15 x cable Ø
  Fixed installation approx. 10 x cable Ø

Cable structure

• Conductor	Bare copper, solid acc. to IEC 60228 cl. 1
• Insulation	Core insulation cross-linked special compound
• Core Identification	Acc. to VDE 0815
• Stranding	Conductors twisted to pairs, each 4 pairs consist to unit, several units stranded to layers
• Screen	Shielding with aluminum-laminated polyester tape and solid tinned copper drain wire
• Outer Sheath	Halogen-free compound acc. to EN 50290-2-27
• Colour	RAL7001 Grey, RAL3000 Red or RAL2003 Orange

Additional Properties

- ROHS Compliant
- Insulation integrity acc. to IEC 60331-23
- Circuit integrity with shock according to EN 50200

in case of Fire:

• Flame Retardant	acc. to IEC 60332-1 -2
• Flame Retardant	acc. to IEC 60332-3-24
• Halogen Free	acc. to DIN EN 50267-2-2
• Low Smoke	acc. to IEC 61034-2
• Low Corrosivity of gases	acc. to IEC 60754-2

We confirm that all products listed in this Data Sheet are manufactured in compliance with the EU Directive 2002/95/EG (RoHS).

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DRAWINGS

Nr	Nr FIRES	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
1	75	JE-H(St)H FE180/E30 1x2x 0.8	1	Korytko kablowe KCOP 300H60/... B-300 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WMCO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV ,Kotwy PSRO M10x80
2		JE-H(St)H FE180/E30 1x2x 0.8		
3	49	NHXCH-O FE180/E90 4x1,5/1,5		
4		NHXCH-O FE180/E90 4x1,5/1,5		
5	48	NHXCH-O FE180/E90 4x50/25		
6		NHXCH-O FE180/E90 4x50/25		
7	47	NHXH-O FE180/E30 3x1,5 TEST	2	Drabina kablowa DGOP400H60/... B-400 1.2 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WMCO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV. Kotwy PSRO M10x80
8	46	NHXH-O FE180/E30 3x1,5 TEST		
9	74	JE-H(St)H FE180/E30 1x2x 0.8		
10		JE-H(St)H FE180/E30 1x2x 0.8		
11	45	NHXCH-O FE180/E90 4x1,5/1,5		
12		NHXCH-O FE180/E90 4x1,5/1,5		
13	44	NHXCH-O FE180/E90 4x50/25		
14		NHXCH-O FE180/E90 4x50/25		
15	70	JE-H(St)H FE180/E90 2x2x 0.8	3	Korytko kablowe KCOP 300H60/... B-300 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WMCO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV . Kotwy PSRO M10x80
16	69	JE-H(St)H FE180/E90 2x2x 0.8		
17	39	NHXH-O FE180/E90 4x1,5		
18		NHXH-O FE180/E90 4x1,5		
19	38	NHXH-O FE180/E90 4x50		
20		NHXH-O FE180/E90 4x50		
21	68	LIHCH FE180/E90 2x1,5 TEST	4	Drabina kablowa DGOP400H60/... B-400 1.2 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WMCO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV . Kotwy PSRO M10x80
22		LIHCH FE180/E90 2x1,5 TEST		
23	67	JE-H(St)H FE180/E90 2x2x 0.8		
24	66	JE-H(St)H FE180/E90 2x2x 0.8		
25	37	NHXH-O FE180/E90 4x1,5		
26		NHXH-O FE180/E90 4x1,5		
27	36	NHXH-O FE180/E90 4x50		
28		NHXH-O FE180/E90 4x50		
29	62	JE-H(St)H FE180/E30 1x2x 0.8	5	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Ceownik CWOP40H40/05, pręt gwintowany PG M10.Do betonu tuleją TRSO M10
30		JE-H(St)H FE180/E30 1x2x 0.8		
31	61	JE-H(St)H FE180/E90 2x2x 0.8		
32	60	JE-H(St)H FE180/E90 2x2x 0.8		
33	24	NHXH-O FE180/E90 4x1,5		
34	23	NHXH-O FE180/E90 4x1,5		
35	22	NHXH-O FE180/E90 4x50		
36	21	NHXH-O FE180/E90 4x50		
37	59	JE-H(St)H FE180/E30 1x2x 0.8	6	Drabina kablowa DGOP400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Ceownik CWOP40H40/05, pręt gwintowany PG M210do betonu tuleją TRSO M10
38		JE-H(St)H FE180/E30 1x2x 0.8		
39	58	JE-H(St)H FE180/E90 2x2x 0.8		
40	57	JE-H(St)H FE180/E90 2x2x 0.8		
41	20	NHXH-O FE180/E90 4x1,5		
42	19	NHXH-O FE180/E90 4x1,5		
43	18	NHXH-O FE180/E90 4x50		
44	17	NHXH-O FE180/E90 4x50		

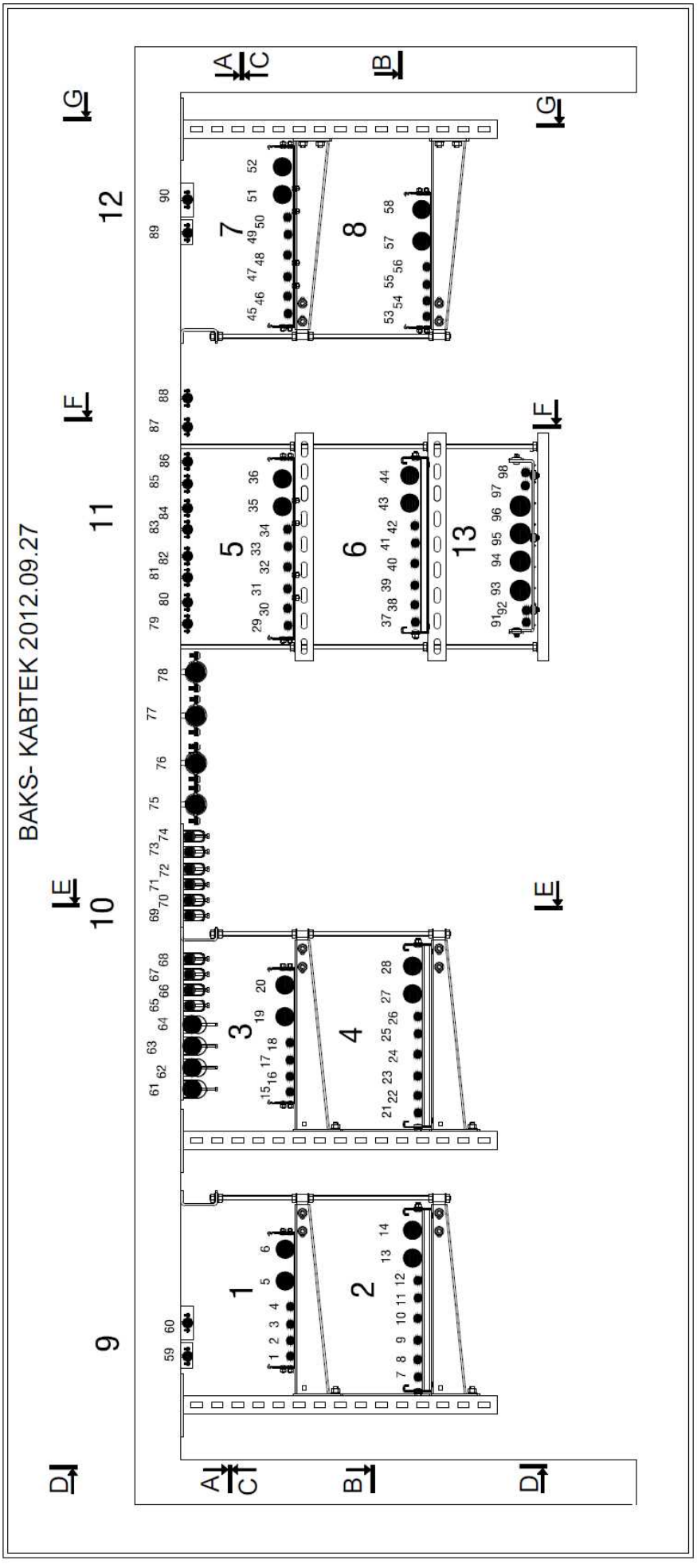
DRAWINGS

Nr	Nr FIRES	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
45	54	LIHCH FE180/E90 2x1,5 TEST	7	Korytko kablowe KGOJ 400H60/... B-400 1.5 m /20kg/m / grubość blachy 0,9 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WWSO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV. Kotwy PSRO M10x80
46		LIHCH FE180/E90 2x1,5 TEST		
47	53	JE-H(St)H FE180/E90 2x2x 0.8		
48		JE-H(St)H FE180/E90 2x2x 0.8		
49	8	NHXH-O FE180/E90 4x1,5		
50	7	NHXH-O FE180/E90 4x1,5		
51	6	NHXH-O FE180/E90 4x50		
52	5	NHXH-O FE180/E90 4x50		
53	52	JE-H(St)H FE180/E30 1x2x 0.8	8	Koytko kablowe KGOL 300H60/... B-300 1.5 m /20kg/m / grubość blachy 0,7 mm Mocowanie : Wspornik WPCO1000, Wysięgnik WWSO400 , pręt gwintowany PG M10 do betonu za pomocą uchwytu USOV. Kotwy PSRO M10x80
54		JE-H(St)H FE180/E30 1x2x 0.8		
55	4	NHXCH-O FE180/E90 4x1,5/1,5		
56	3	NHXCH-O FE180/E90 4x1,5/1,5		
57	2	NHXCH-O FE180/E90 4x50/25		
58	1	NHXCH-O FE180/E90 4x50/25		
59	51	NHXH-O FE180/E90 4x1,5	9	Uchwyty kablowe KSA. Mocowanie do betonu co 600mm + puszki PSO1 ,PSO 2
60	50	NHXH-O FE180/E90 4x1,5		
61	43	NHXCH-O FE180/E90 4x50/25	10	Uchwyty kablowe UKO1+ SDOP 600, Mocowanie do betonuco 600mm. SRO M6x30
62		NHXCH-O FE180/E90 4x50/25		
63	42	NHXH-O FE180/E90 4x50		
64		NHXH-O FE180/E90 4x50		
65	41	NHXCH-O FE180/E90 4x1,5/1,5		
66		NHXCH-O FE180/E90 4x1,5/1,5		
67	40	NHXH-O FE180/E90 4x1,5		
68		NHXH-O FE180/E90 4x1,5		
69	73	JE-H(St)H FE180/E90 2x2x 0.8		
70	72	JE-H(St)H FE180/E90 2x2x 0.8		
71	35	(N)HXH-O FE180/E90 3x1,5 TEST		
72	34	(N)HXH-O FE180/E90 3x1,5 TEST		
73	71	JE-H(St)H FE180/E30 1x2x 0.8		
74		JE-H(St)H FE180/E30 1x2x 0.8		
75	33	NHXCH-O FE180/E90 4x50/25	11	Uchwyty kablowe KSA. Mocowanie do betonu co 600mm . SRO M6x30
76		NHXCH-O FE180/E90 4x50/25		
77	32	NHXH-O FE180/E90 4x50		
78	31	NHXH-O FE180/E90 4x50		
79	30	NHXCH-O FE180/E90 4x1,5/1,5		
80	29	NHXCH-O FE180/E90 4x1,5/1,5		
81	28	NHXH-O FE180/E90 4x1,5		
82	27	NHXH-O FE180/E90 4x1,5		
83	65	JE-H(St)H FE180/E90 2x2x 0.8		
84	64	JE-H(St)H FE180/E90 2x2x 0.8		
85	26	(N)HXH-O FE180/E90 3x1,5 TEST		
86	25	(N)HXH-O FE180/E90 3x1,5 TEST		
87	63	JE-H(St)H FE180/E30 1x2x 0.8		
88		JE-H(St)H FE180/E30 1x2x 0.8		

DRAWINGS

Nr	Nr FIRES	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
89	56	JE-H(St)H FE180/E90 2x2x 0.8	12	Uchwyty kablowe KSA. Mocowanie do betonu co 600mm + puszki PSO1 ,PSO 2
90	55	JE-H(St)H FE180/E90 2x2x 0.8		
91	16	NHXH-O FE180/E90 4x1,5	13	Korytko siatkoweKDSO400H60/... B-400 /20kg/m / średnica drutu 1,5 mm Mocowanie : Ceownik CWOP40H22/05, pręt gwintowany PG M10 do betonu tuleją TRSO M10
92	15	NHXH-O FE180/E90 4x1,5		
93	14	NHXH-O FE180/E90 4x50		
94	13	NHXH-O FE180/E90 4x50		
95	12	NHXCH-O FE180/E90 4x50/25		
96	11	NHXCH-O FE180/E90 4x50/25		
97	10	NHXCH-O FE180/E90 4x1,5/1,5		
98	9	NHXCH-O FE180/E90 4x1,5/1,5		

DRAWINGS



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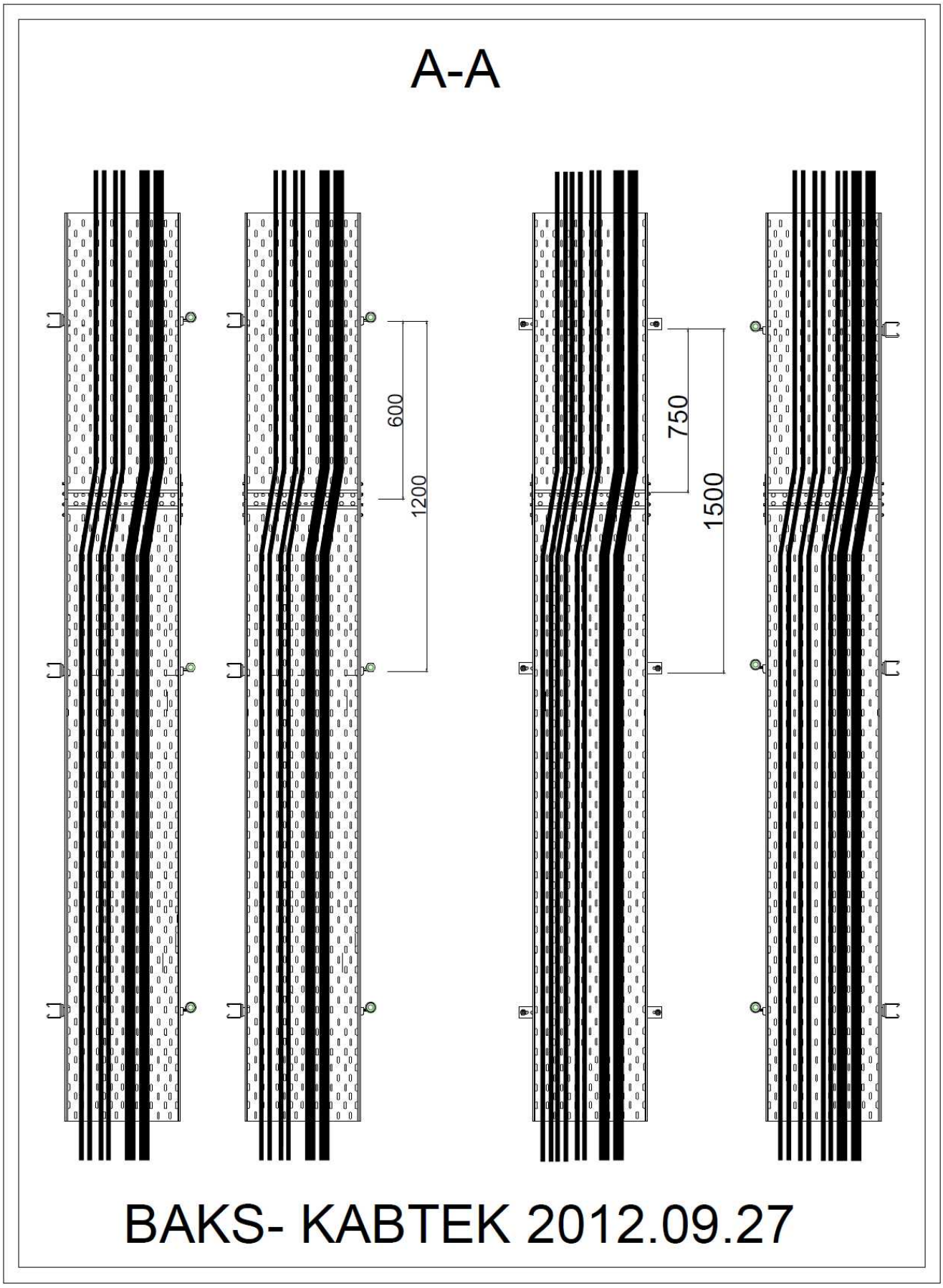

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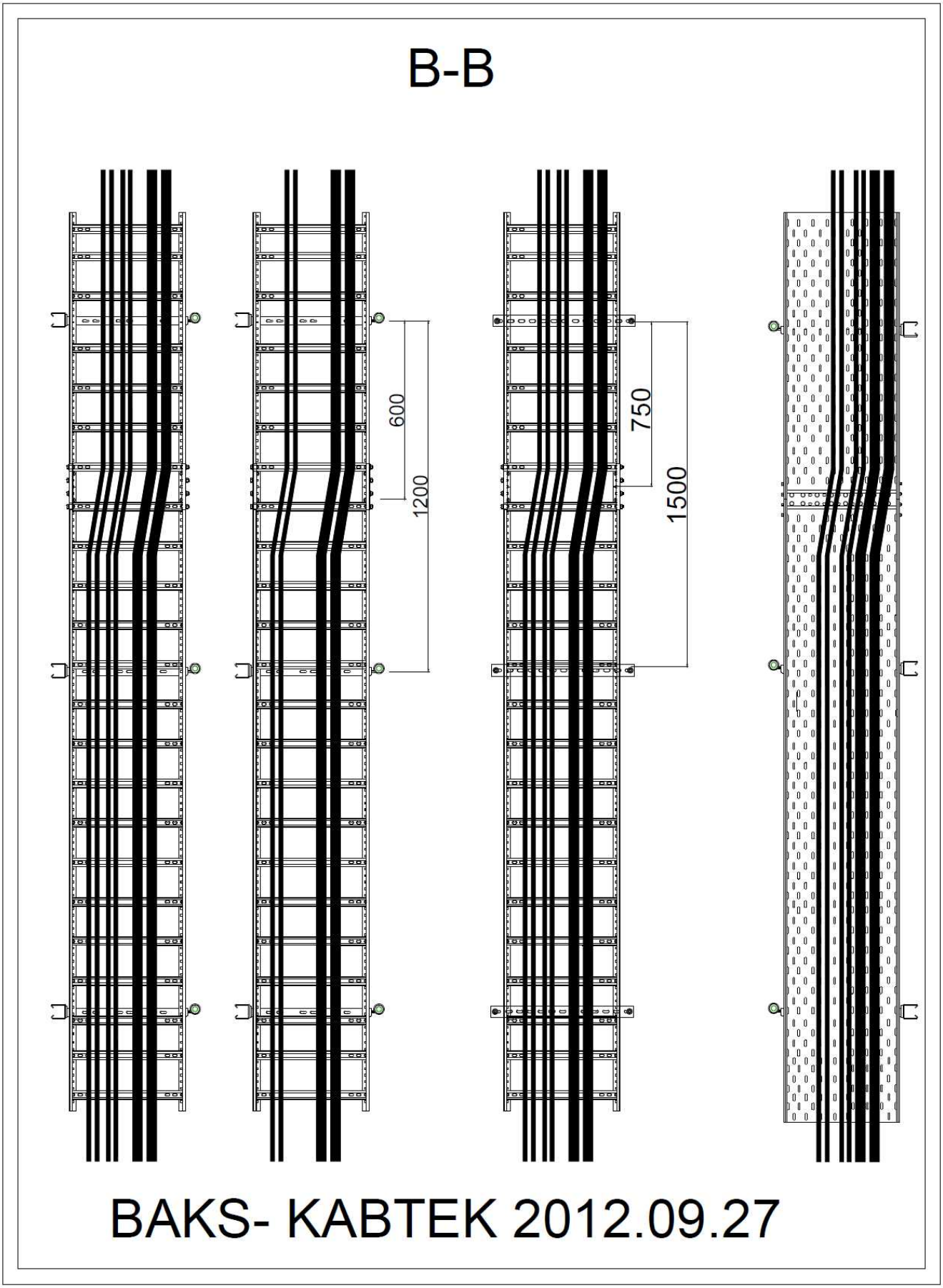

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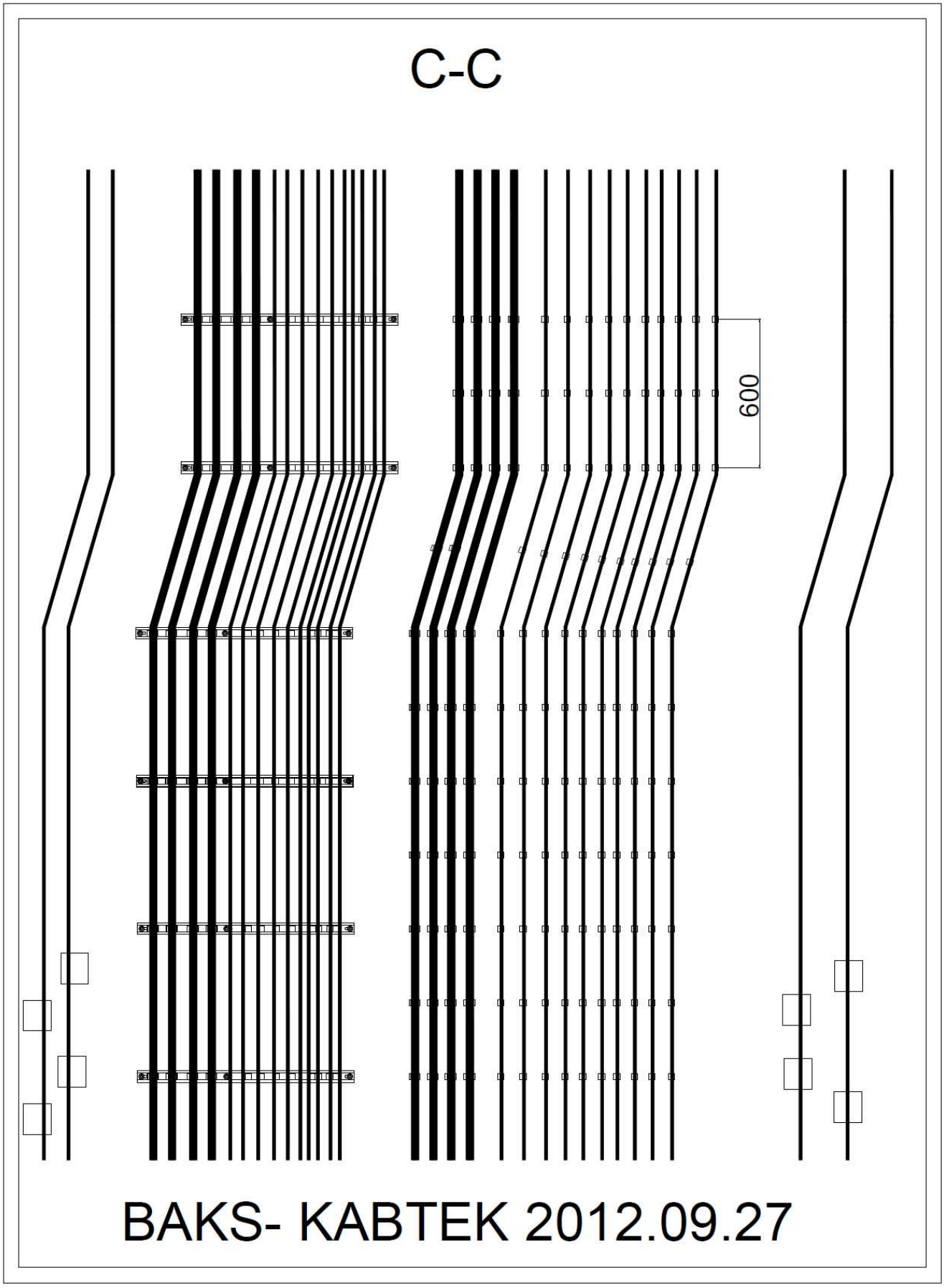

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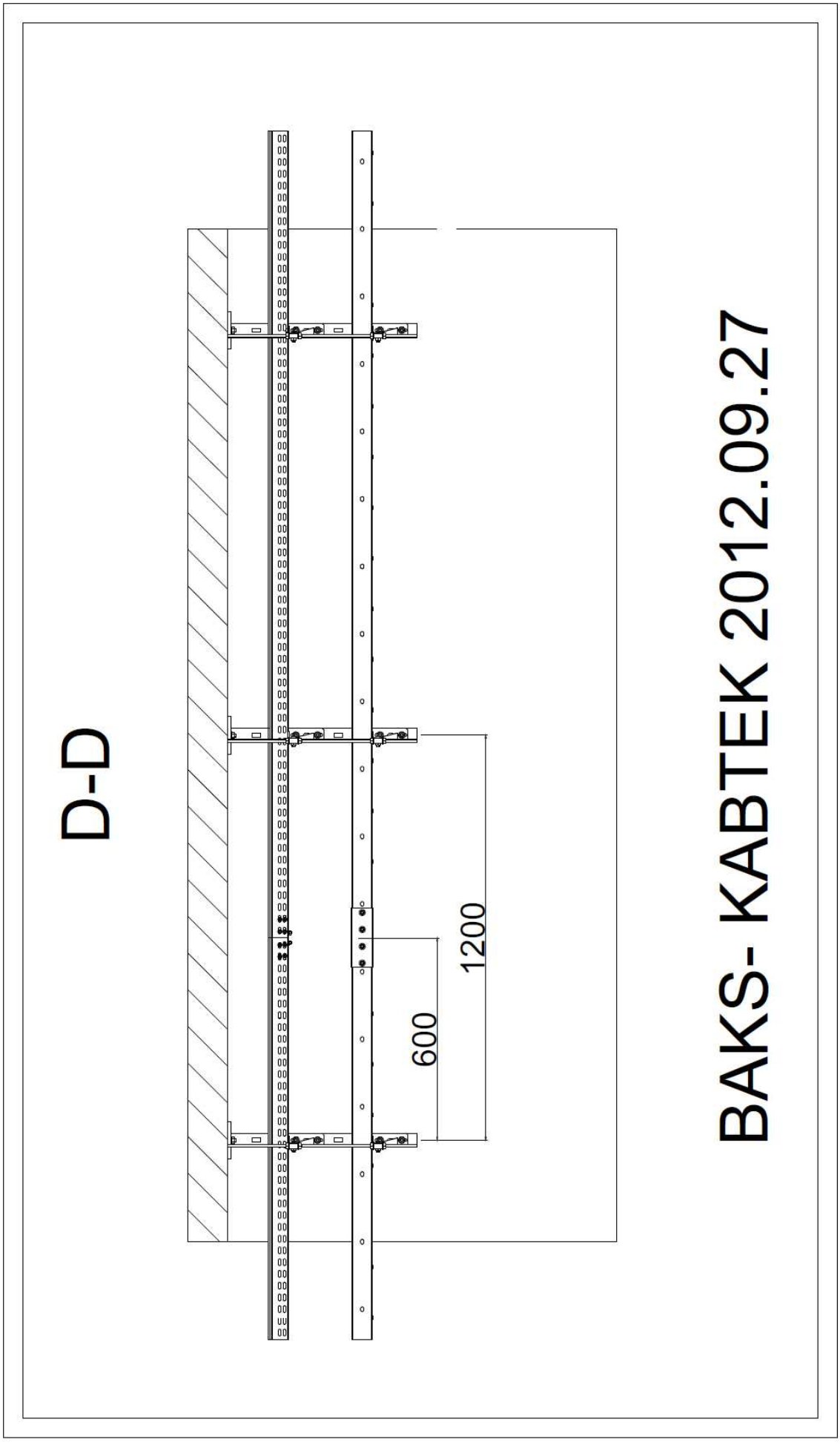

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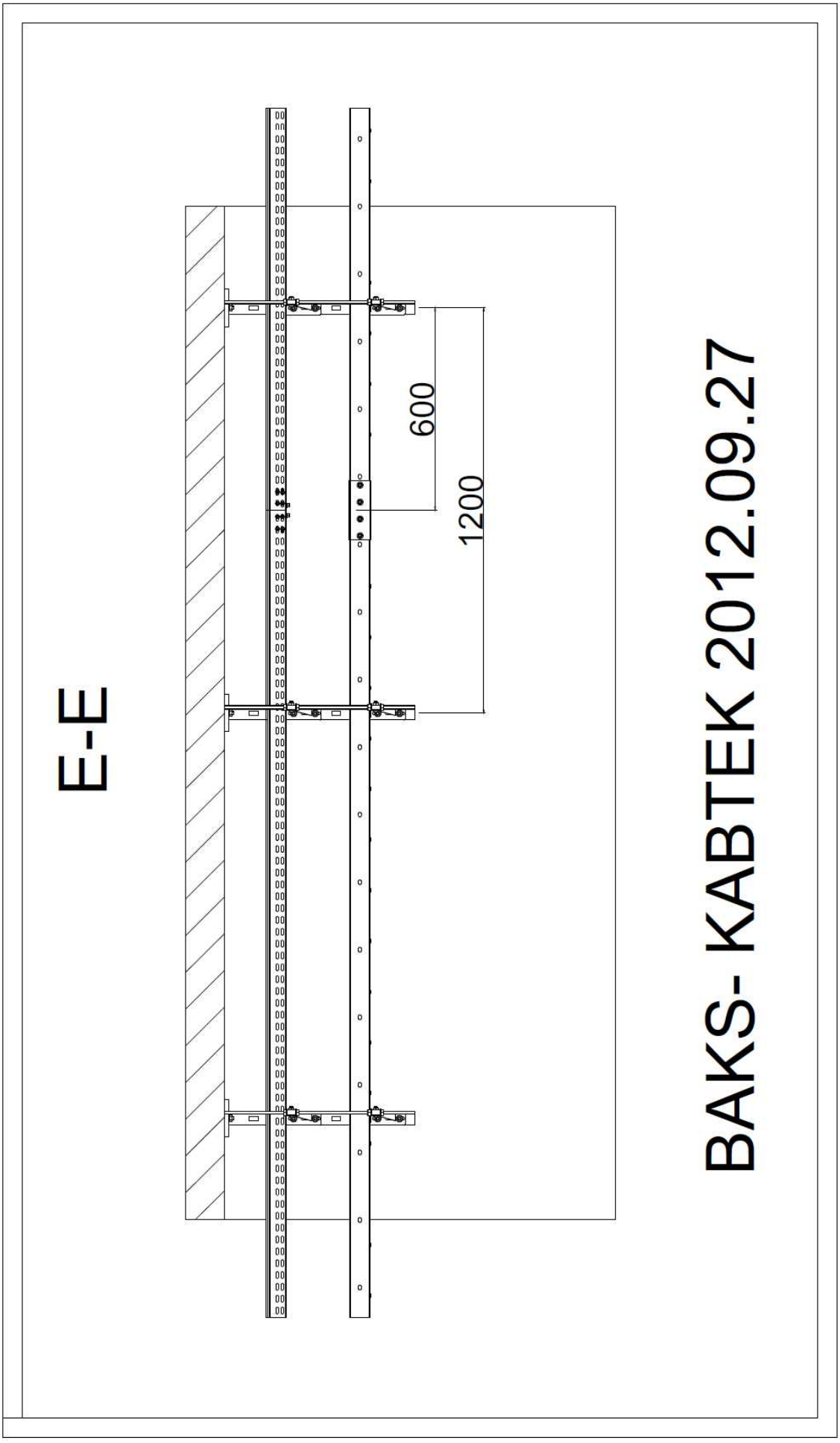

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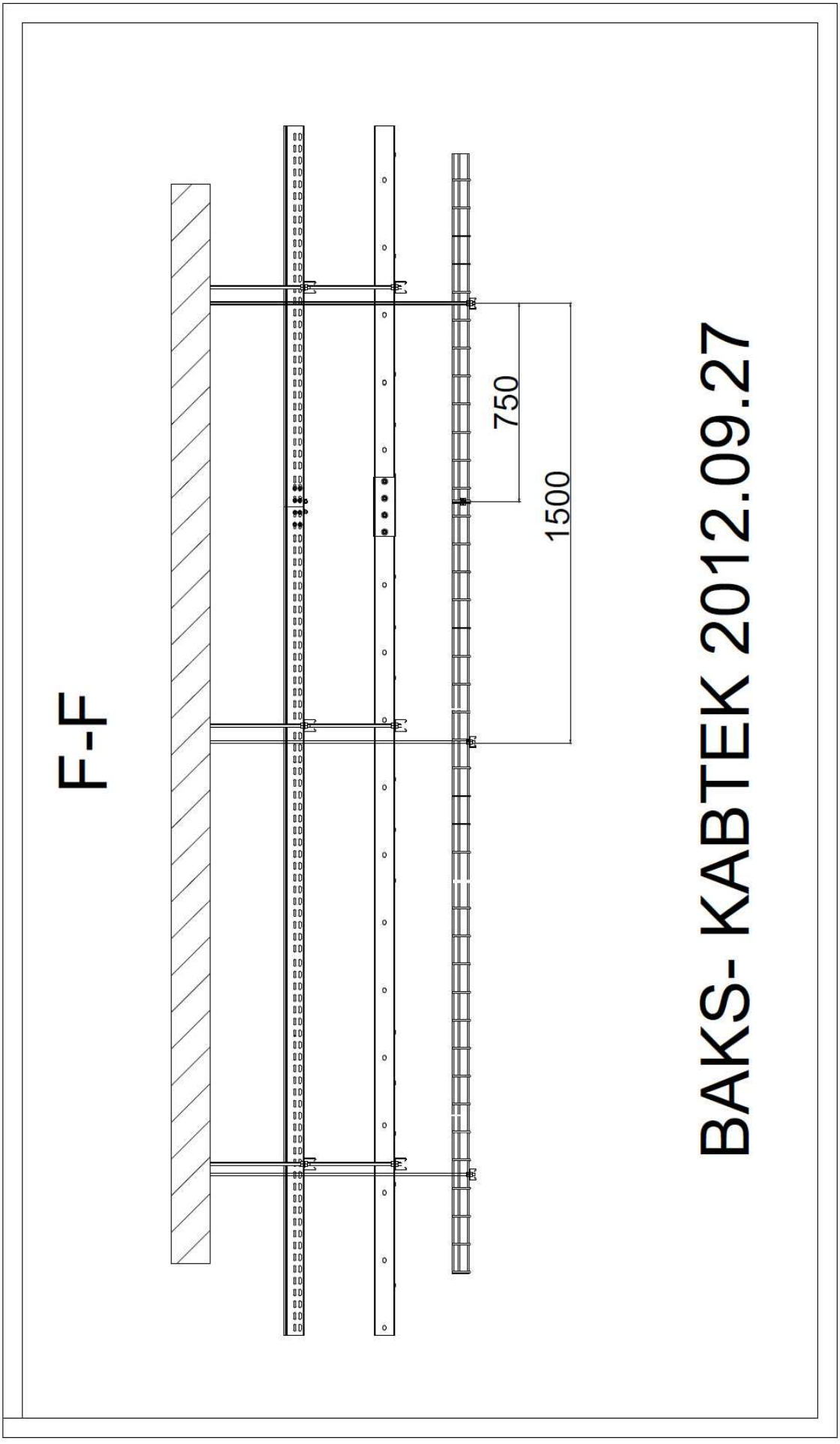

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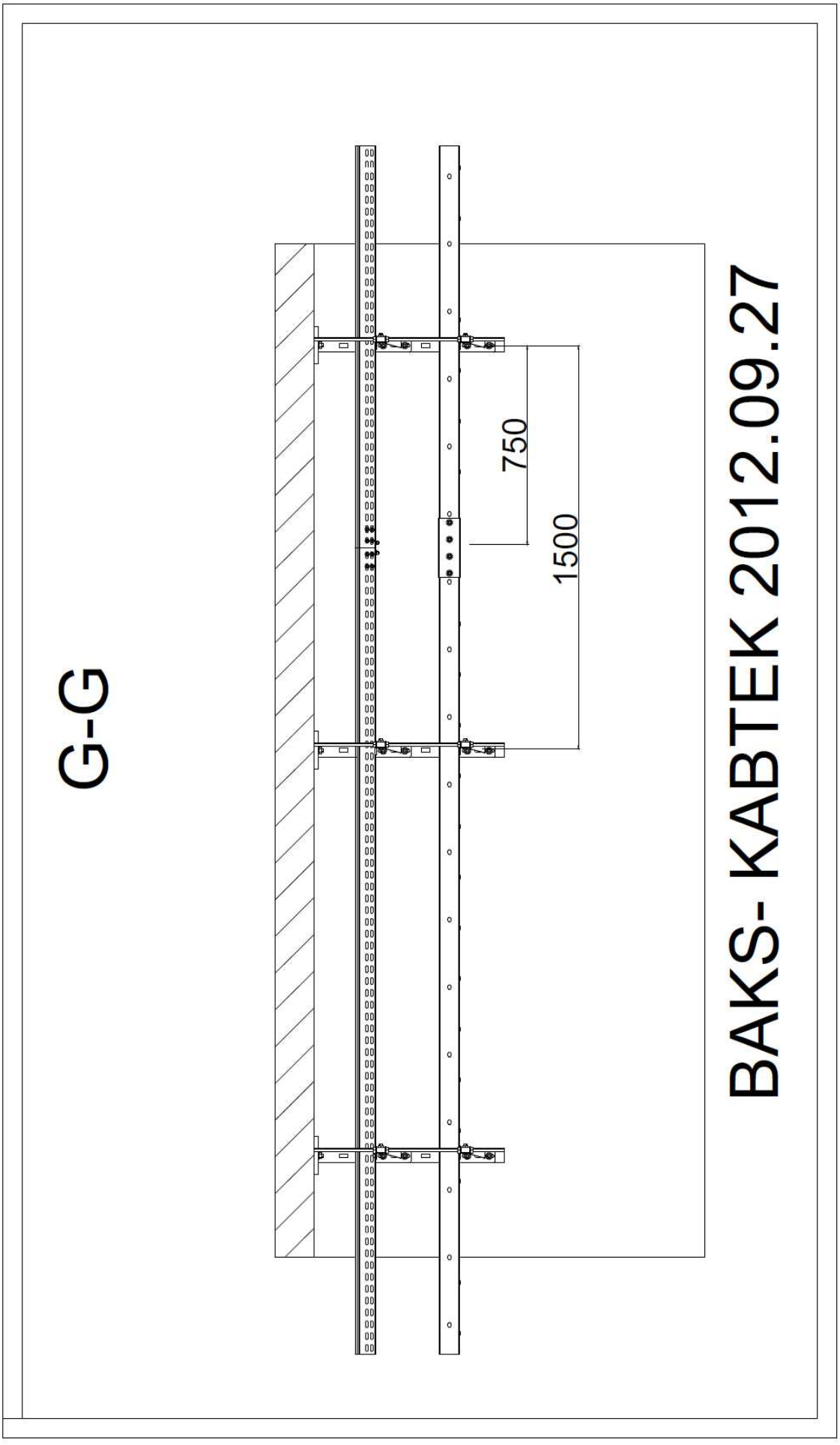

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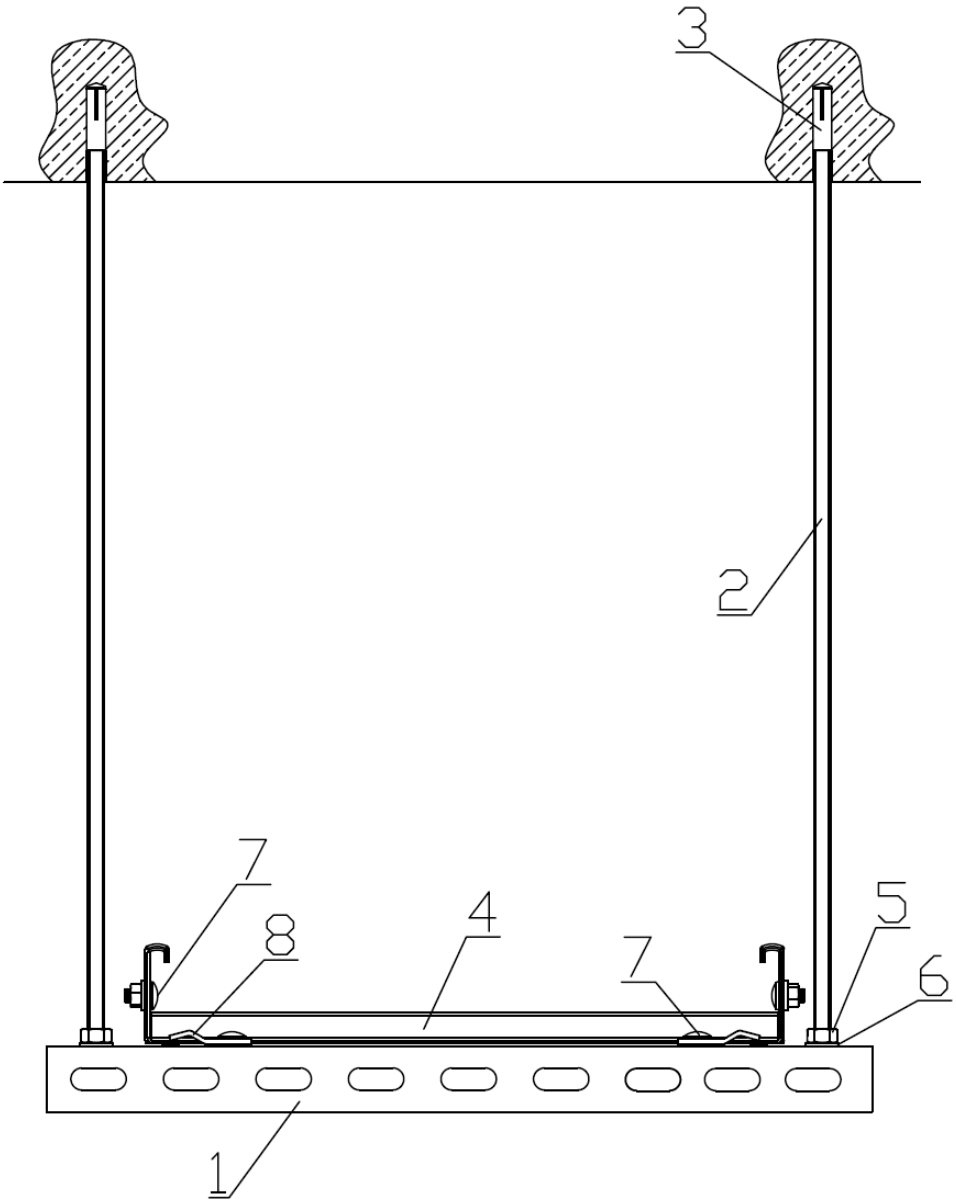
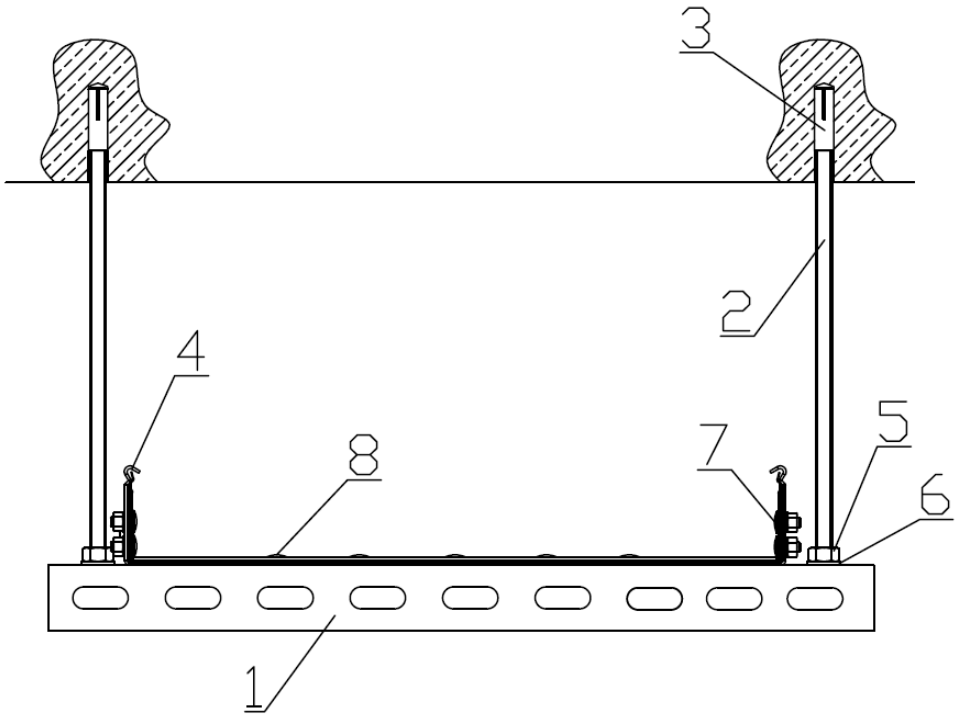


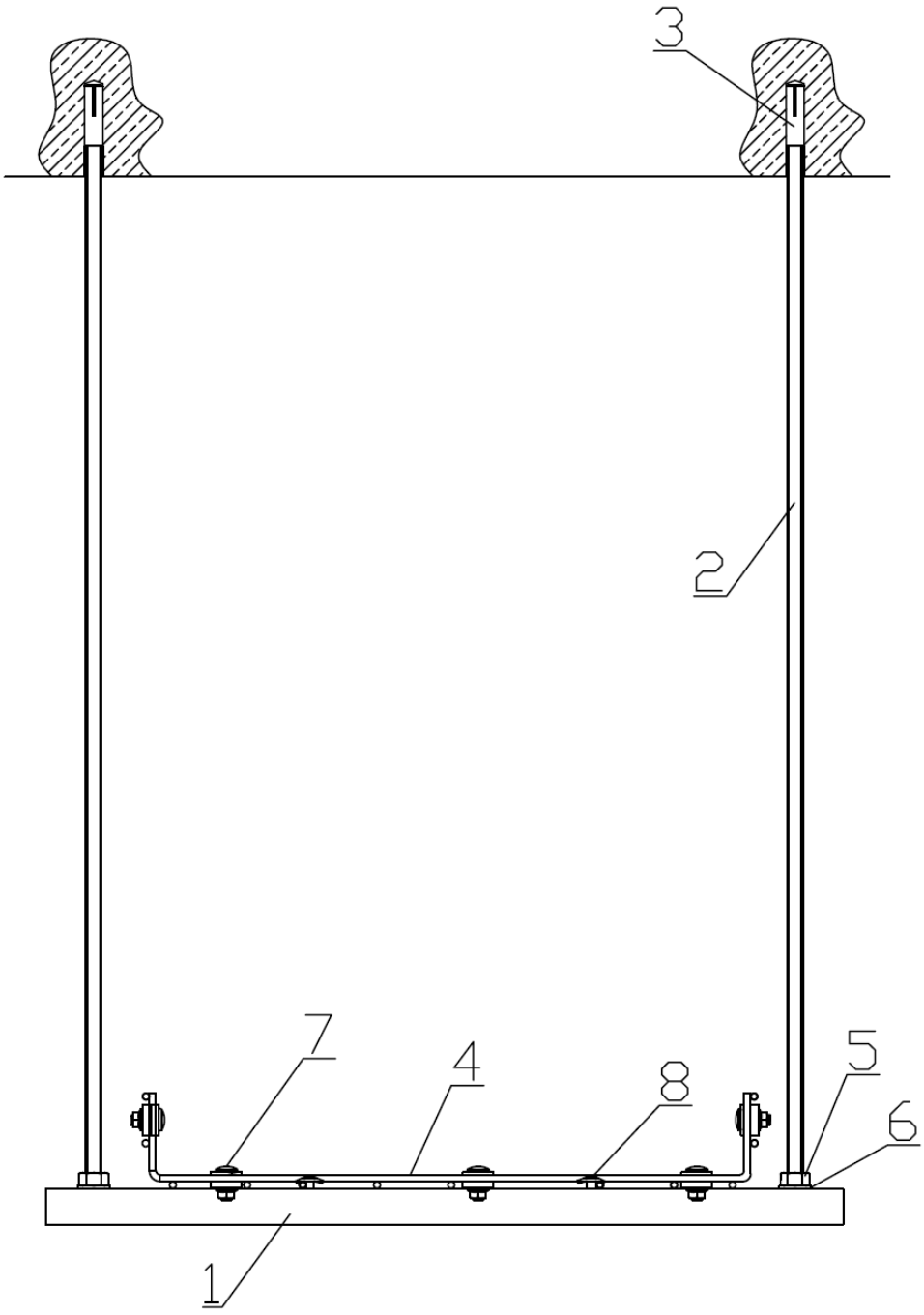
L.p.	Nazwa	Symbol	Szt.
8	Zacisk mocujący	ZM□	2
7	Śruba z łbem grzybkowym	SGN M8x14	4
6	Podkładka	PP10	2
5	Nakrętka	NSM8	2
4	Drabinka kablowa	DG□P400H60/3 N	1
3	Tuleja rozporowa stalowa	TRS□M10	2
2	Pręt gwintowany	PGM10	2
1	Ceownik wzmocniony	CW□P40H40/05	1

DRAWINGS



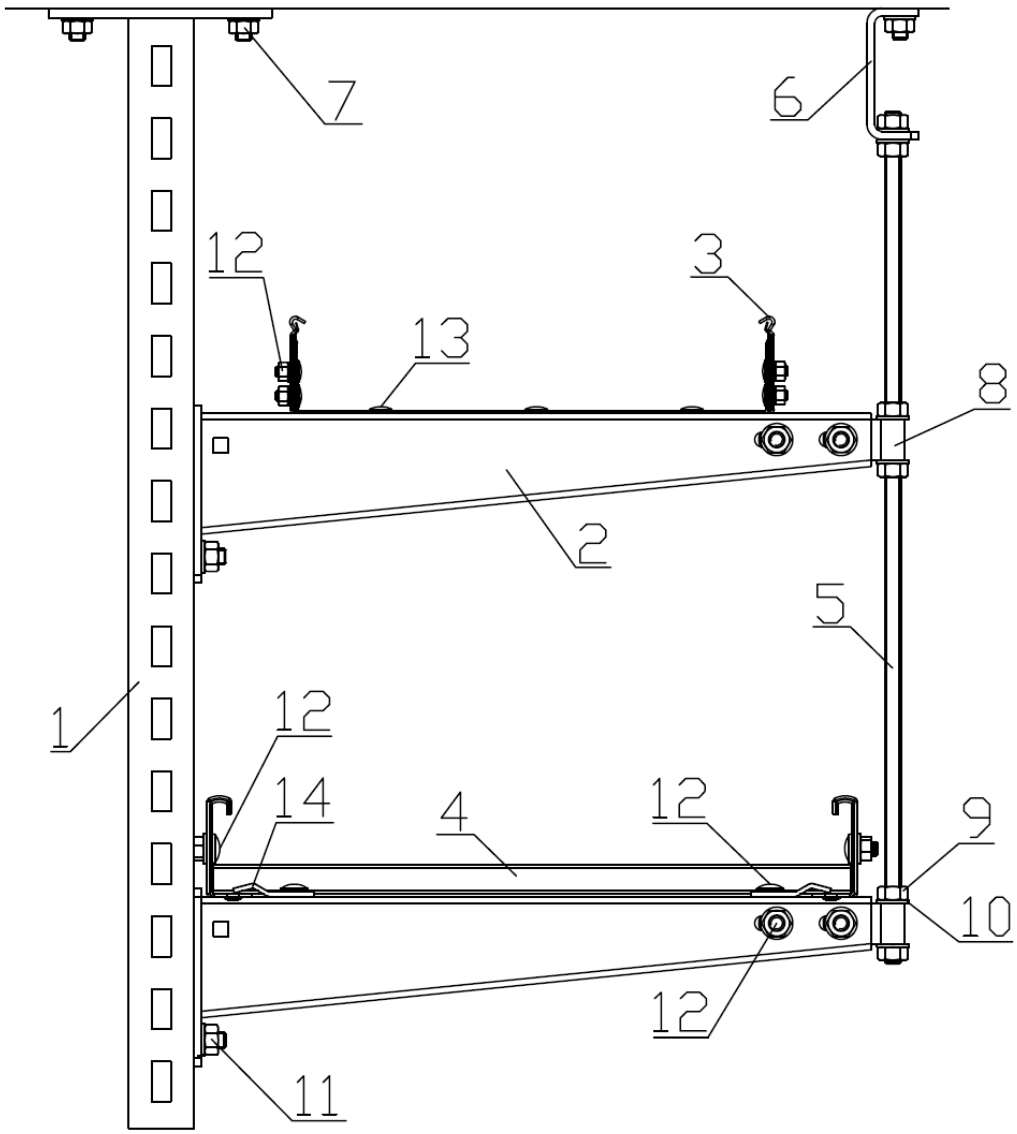
L.p.	Nazwa	Symbol	Szt.
8	Śruba z łbem grzybkowym	SGN M6x12	5
7	Śruba z łbem grzybkowym	SGN M8x14	4
6	Podkładka	PP10	2
5	Nakrętka	NSM10	2
4	Korytko kablowe	KC□P400H60/3 N	1
3	Tuleja rozporowa stalowa	TRS□M10	2
2	Pręt gwintowany	PGM10	2
1	Ceownik wzmocniony	CW□P40H40/05	1

DRAWINGS



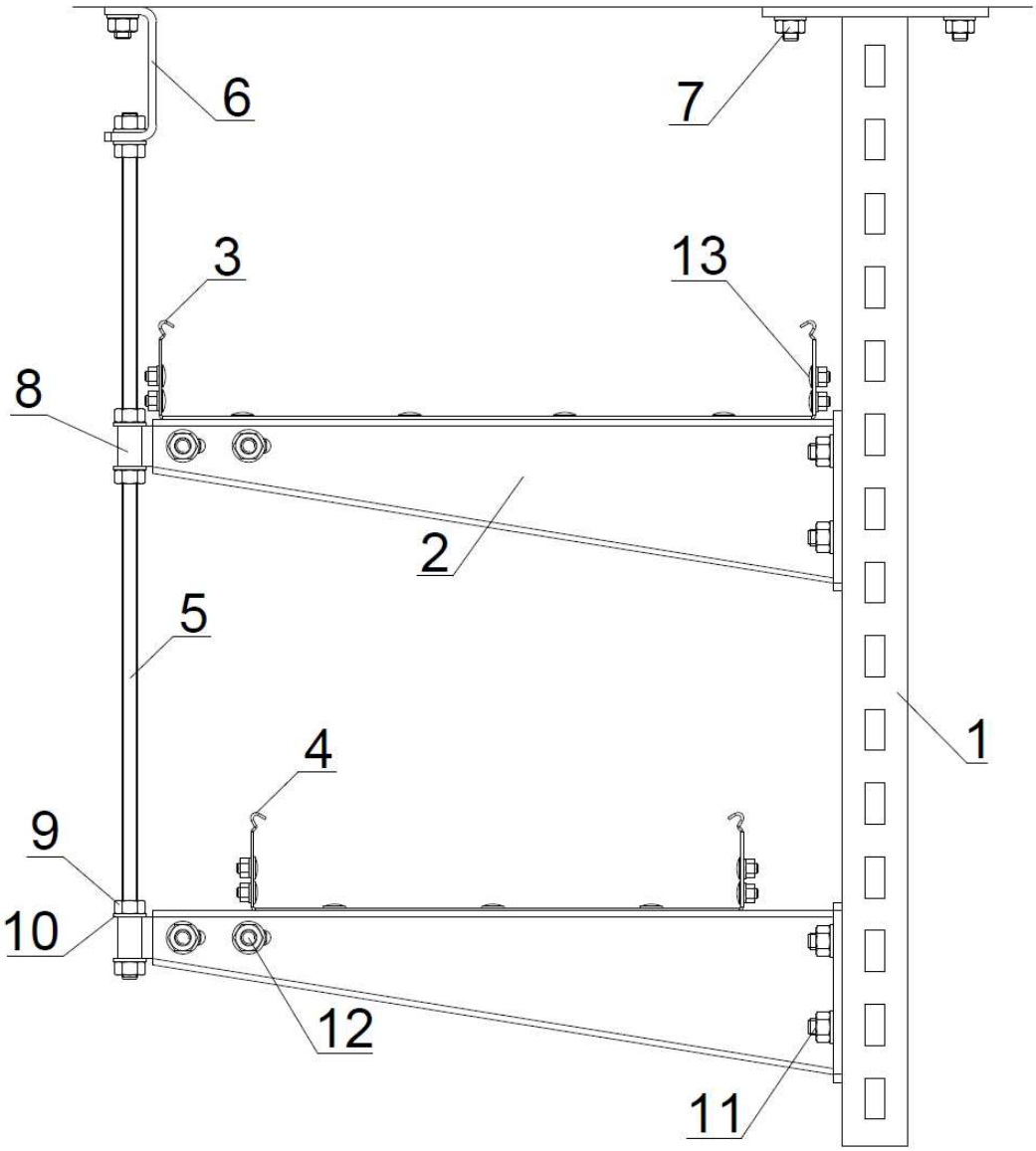
L.p.	Nazwa	Symbol	Szt.
8	Zacisk śrubowy	ZS□	2
7	Uchwyt śrubowy	USS□	5
6	Podkładka	PP10	2
5	Nakrętka	NSM10	2
4	Korytko siatkowe	KDS□400H60/3	1
3	Tuleja rozporowa stalowa	TRS□M10	2
2	Pręt gwintowany	PGM10	2
1	Ceownik wzmocniony	CW□P40H22/05	1

DRAWINGS



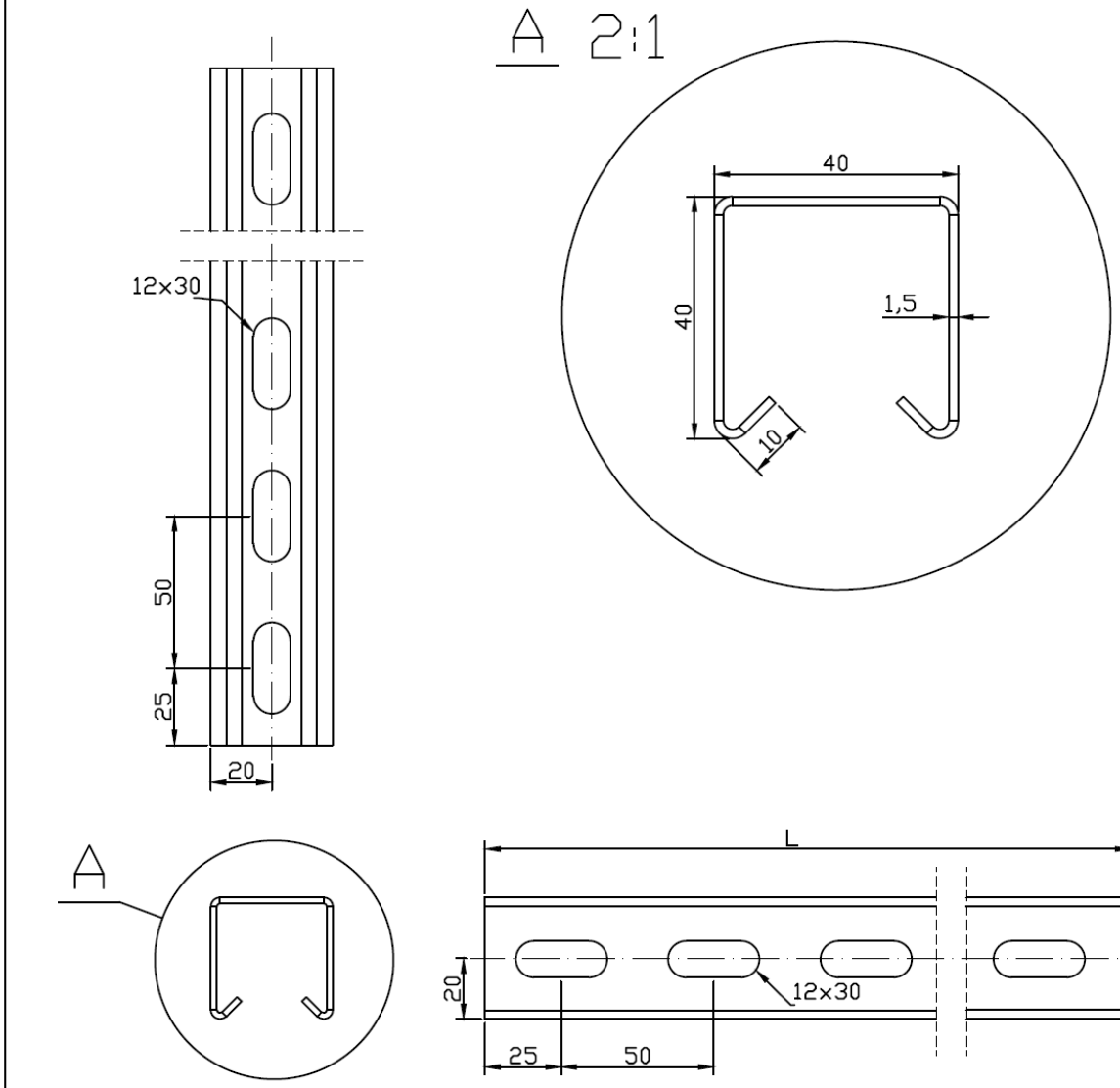
L.p.	Nazwa	Symbol	Szt.
14	Zacisk mocujący	ZM□	2
13	Śruba z łbem grzybkowym	SGN M6x12	3
12	Śruba z łbem grzybkowym	SGN M8x14	12
11	Śruba (kpl.)	SMM10x30	4
10	Podkładka	PP10	6
9	Nakrętka	NSM10	6
8	Uchwyt	UPW□	2
7	Śruba rozporowa	PSR□M10x80	3
6	Uchwyt sufitowy	US□V	1
5	Pręt gwintowany	PGM10/1	1
4	Drabinka kablowa	DG□P400H60/3 N	1
3	Korytko kablowe	KC□P300H60/3 N	1
2	Wysięgnik	WMC□400	2
1	Wspornik sufitowy	WPC□1000	1

DRAWINGS



L.p.	Nazwa	Symbol	Szt.
13	Śruba z łbem grzybkowym	SGN M6x12	15
12	Śruba z łbem grzybkowym	SGN M8x14	4
11	Śruba (kpl.)	SMM10x30	4
10	Podkładka	PP10	6
9	Nakrętka	NSM10	6
8	Uchwyt	UPWO	2
7	Śruba rozporowa	PSROM10x80	3
6	Uchwyt sufitowy	USOV	1
5	Pręt gwintowany	PGM10	1
4	Korytko kablowe	KGOL300H60/3	1
3	Korytko kablowe	KGOJ400H60/3	1
2	Wysięgnik	WWSO400	2
1	Wspornik sufitowy	WPCO1000	1

DRAWINGS



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

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

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

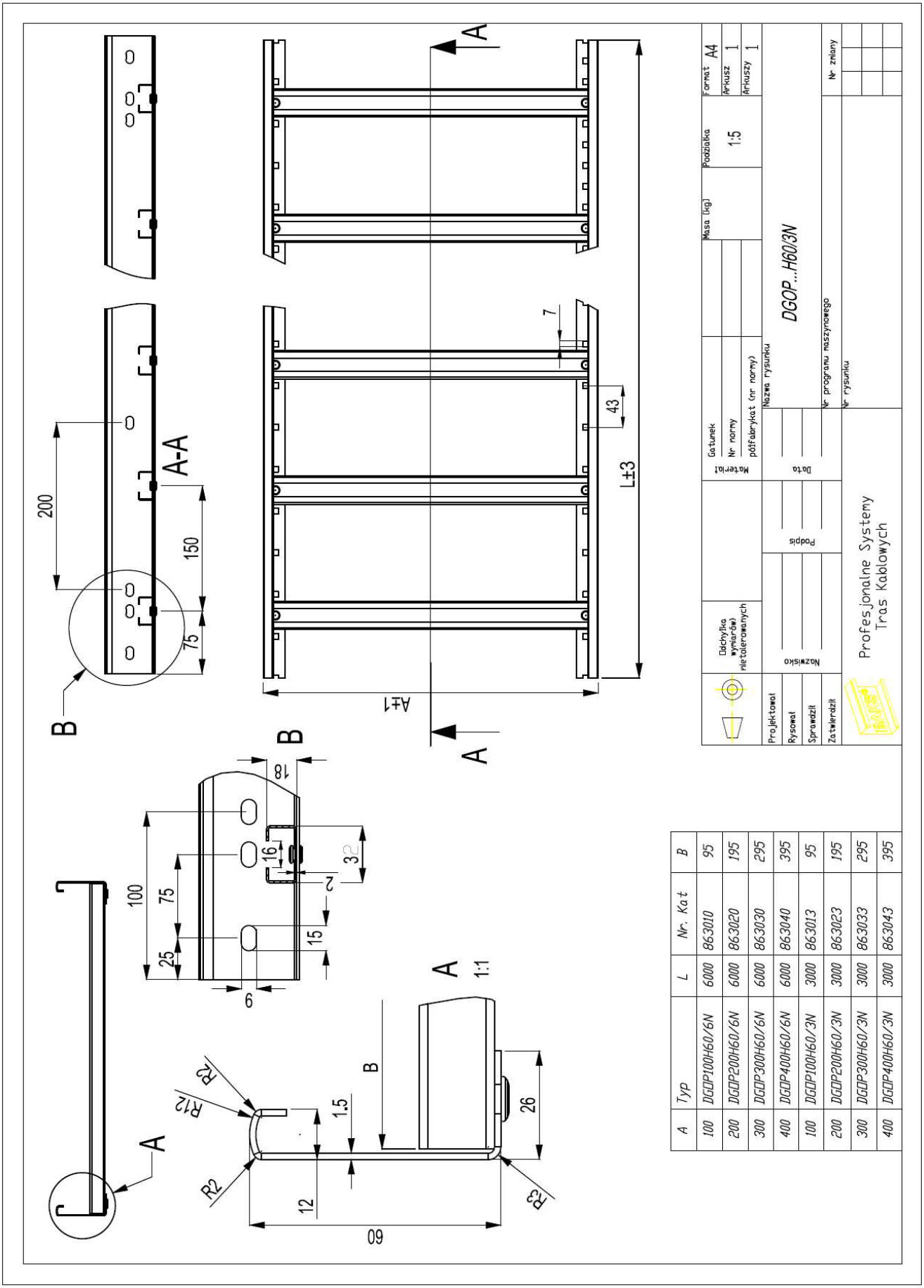
Nazwa rysunku: CW□P40H40/...

Nr zmiany

Profesjonalne Systemy Tras Kablowych

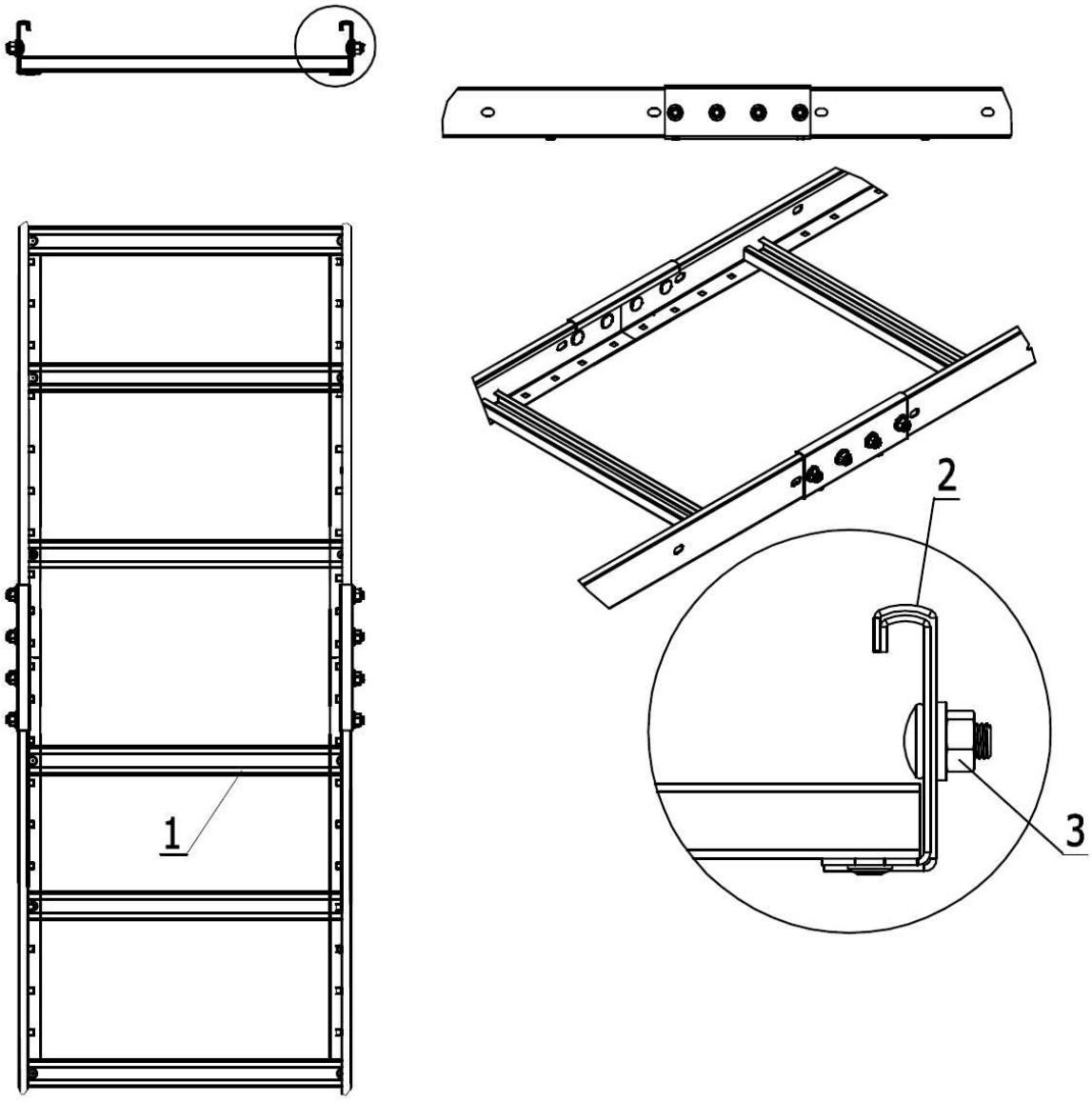
Nr rysunku

DRAWINGS



A	Typ	L	Nr. Kat	B
100	DGOP100H60/6N	6000	863010	95
200	DGOP200H60/6N	6000	863020	195
300	DGOP300H60/6N	6000	863030	295
400	DGOP400H60/6N	6000	863040	395
100	DGOP100H60/3N	3000	863013	95
200	DGOP200H60/3N	3000	863023	195
300	DGOP300H60/3N	3000	863033	295
400	DGOP400H60/3N	3000	863043	395

DRAWINGS



Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
3	Śruba	SGN M8x14		8	
2	Łącznik	LD□CH60N		2	
1	Drabinka	DG□P400H60/3N		2	

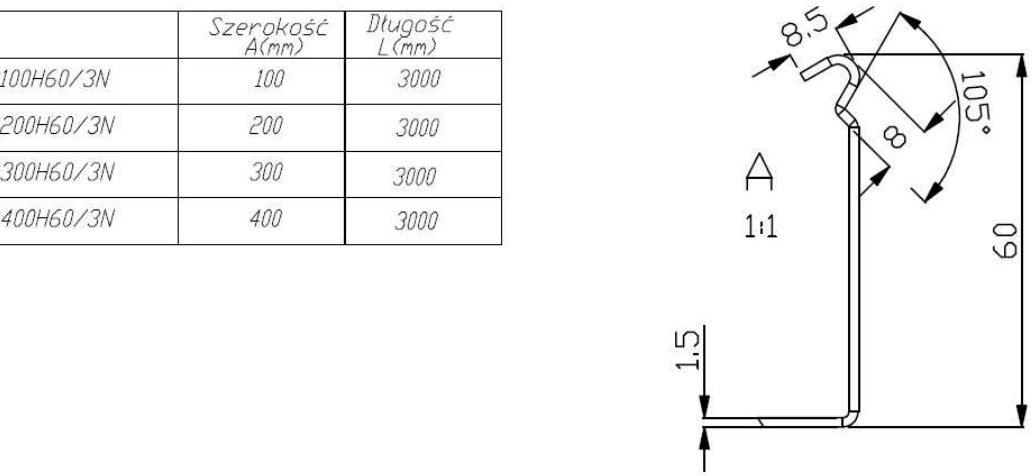
Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy				Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1

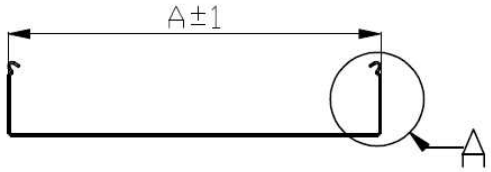
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: DG□P400H60/3N
Rysował				
Sprawdził				
Zatwierdził				Nr programu maszynowego / Nr rysunku / Nr zmiany

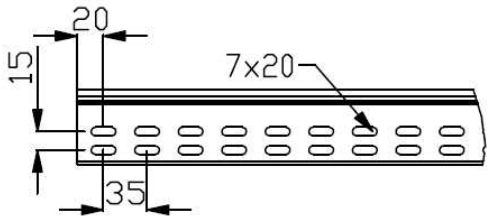
Profesjonalne Systemy Tras Kablowych

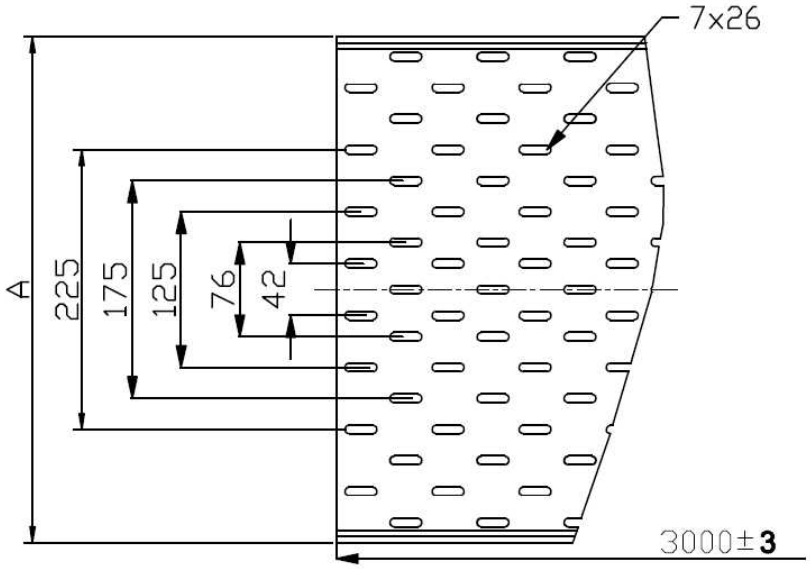
DRAWINGS

Typ	Szerokość A(mm)	Długość L(mm)
KC□P100H60/3N	100	3000
KC□P200H60/3N	200	3000
KC□P300H60/3N	300	3000
KC□P400H60/3N	400	3000





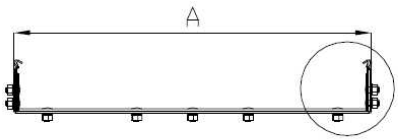


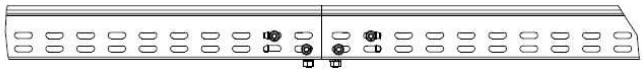


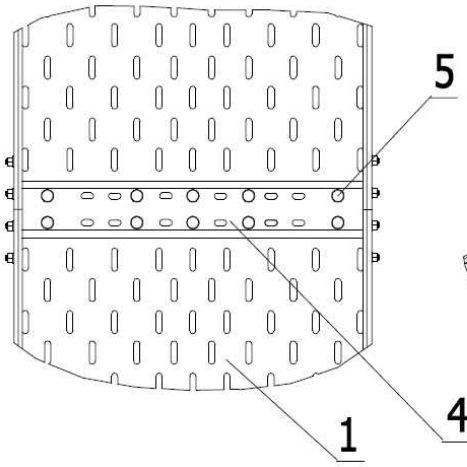
L-lakier proszkowy poliuretanowy

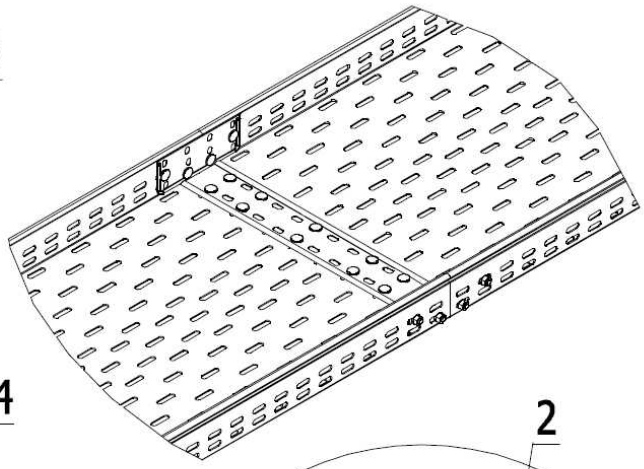
	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy				Arkusz
			półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: KC□P...H60/3N			
Rysował							
Sprawdził							
Zatwierdził				Nr programu maszynowego			Nr zmiany
	Profesjonalne Systemy Tras Kablowych			Nr rysunku			

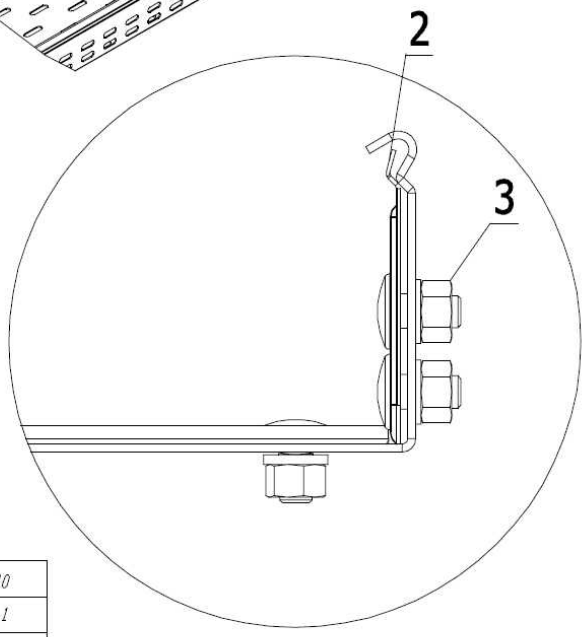
DRAWINGS











Poz.1		Poz.4
A	Typ	Typ
100	KC□P100H60/3N	BL□100N
200	KC□P200H60/3N	BL□200N
300	KC□P300H60/3N	BL□300N
400	KC□P400H60/3N	BL□400N

Pos.	Nazwa	Symbol	Ilość
5	Śruba	SGN M6x12	10
4	Blacha łącznikowa	BL□400N	1
3	Śruba	SGN M8x14	8
2	Łącznik	LP□PH60N	2
1	Koryto	KC□P400H60/3N	2

Odchyłka wymiarów nietolerowanych

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

Masa [kg] | Podziałka | Format A4 | Arkusz 1 | Arkuszy 1

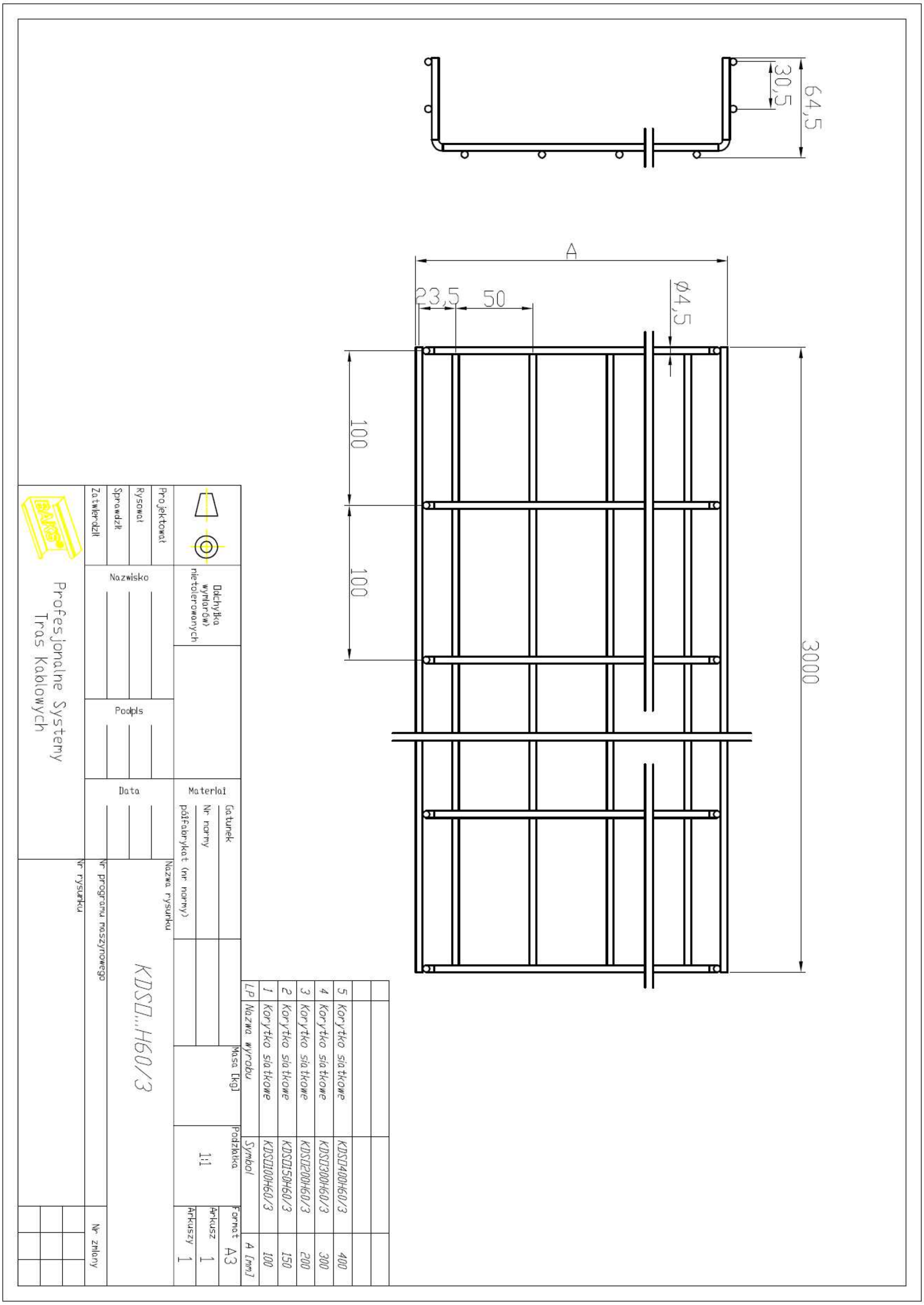
Projektował | Rysował | Sprawdził | Zatwierdził | Nazwisko | Podpis | Data

Nazwa rysunku: Połączenie KC□P400H60/3N

Nr programu maszynowego | Nr zmiany | Nr rysunku

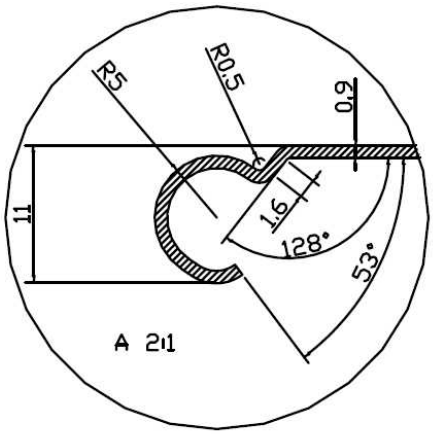
Profesjonalne Systemy Tras Kablowych

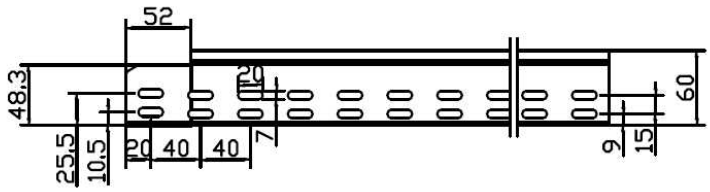
DRAWINGS

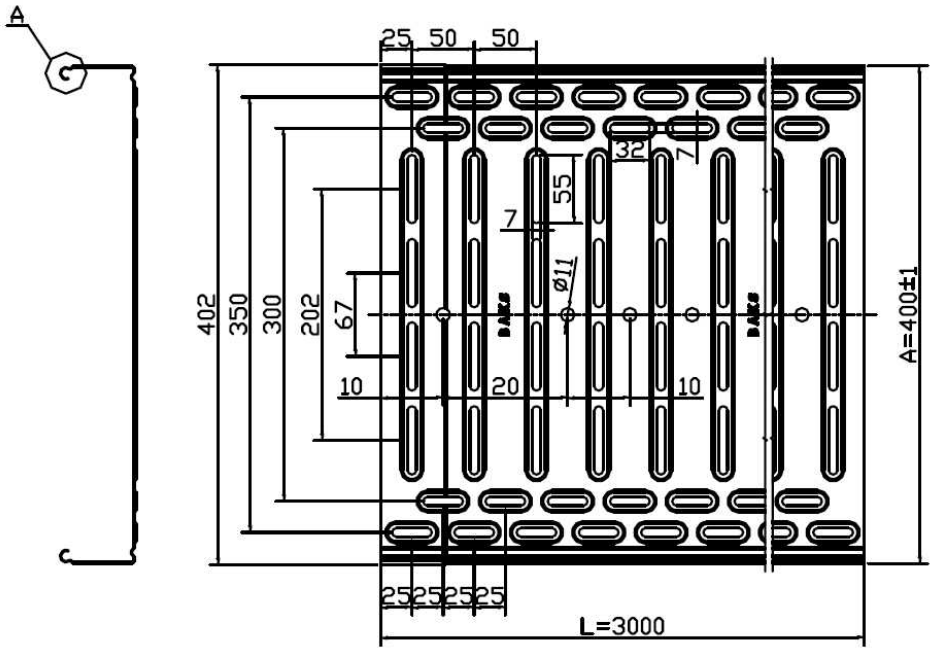

30,5
64,5
A
23,5
50
Ø4,5
100
100
3000
Projektował
Rysował
Sprawdził
Zatwierdził
Nazwisko
Podpis
Data
Odchyłka wymiarów nietolerowanych
Materiał
Gatunek
Nr normy
półfabrykat (nr normy)
Profesjonalne Systemy Tras Kablowych
Nazwa rysunku
KDSO..H60/3
Nr programu maszynowego
Nr rysunku
Nr zmiany
Masa [kg]
Podziałka
1:1
Format
A3
Arkusz
1
Arkuszy
1
LP Nazwa wyrobu Symbol A [mm]
1 Korytko siatkowe KDSO100H60/3 100
2 Korytko siatkowe KDSO150H60/3 150
3 Korytko siatkowe KDSO200H60/3 200
4 Korytko siatkowe KDSO300H60/3 300
5 Korytko siatkowe KDSO400H60/3 400

DRAWINGS

Typ	Szerokość A(mm)	Długość L(mm)
KGOJ100H60/3	100	3000
KGOJ200H60/3	200	3000
KGOJ300H60/3	300	3000
KGOJ400H60/3	400	3000



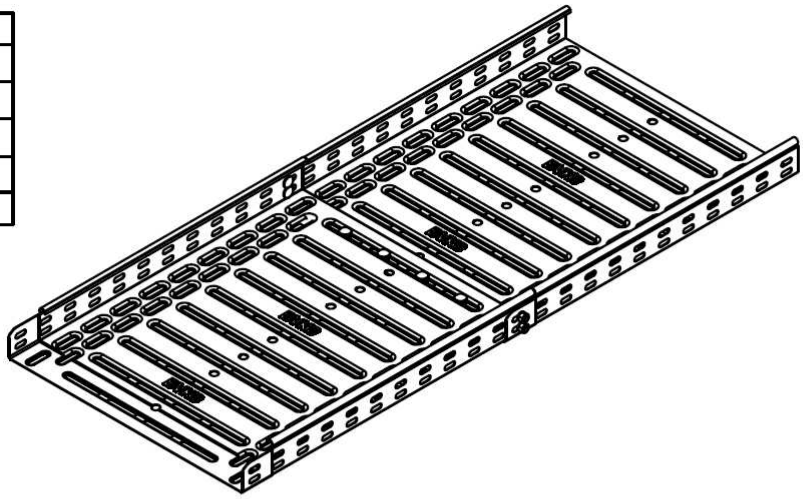


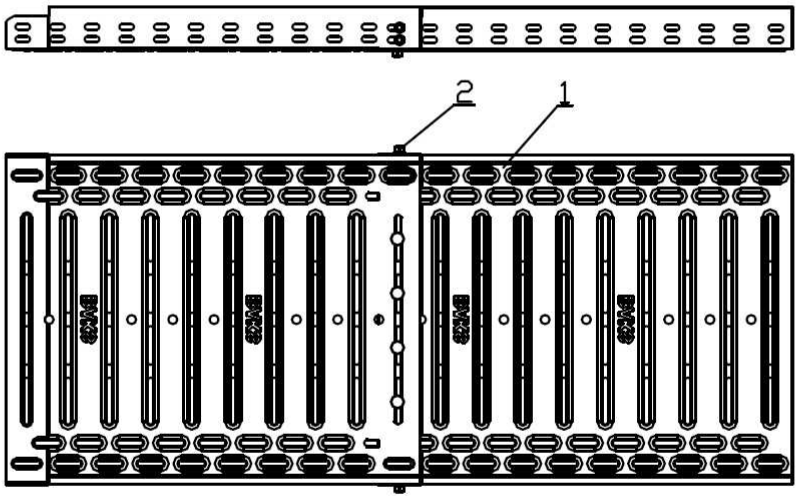


Dachówka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:5	Format A4
		Nr normy				Arkusz
		półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: KGOJ400H60/3		
Rysował						
Sprawdził						
Zatwierdził				Nr programu maszynowego		Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku		

DRAWINGS

Poz.1		Poz.2
A	Typ	Ilość
100	KGDJ100H60/3	4
200	KGDJ200H60/3	5
300	KGDJ300H60/3	9
400	KGDJ400H60/3	9





L.p.	Nazwa	Symbol	Materiał	Szt.	Nr katalogowy
2	Śruba z łbem grzybkowym	SGN M6x12		8	
1	Korytko	KGDJ400H60/3		2	

Dokładność wymiarów nietolerowanych

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

Masa brutto | Masa netto | Format A4 | Arkusz 1 | Arkuszy 1

Projektował | Rysował | Sprawdził | Zatwierdził | Nazwisko | Podpis | Data

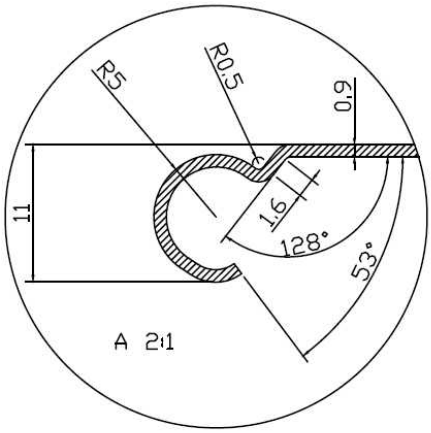
Nazwa rysunku: KGDJ400H60/3

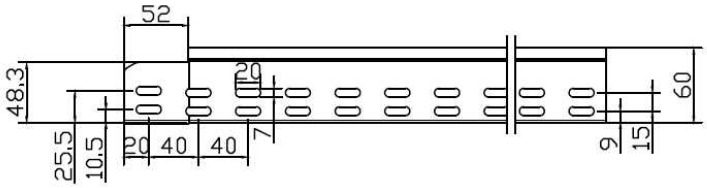
Nr programu maszynowego | Nr rysunku | Nr zmiany

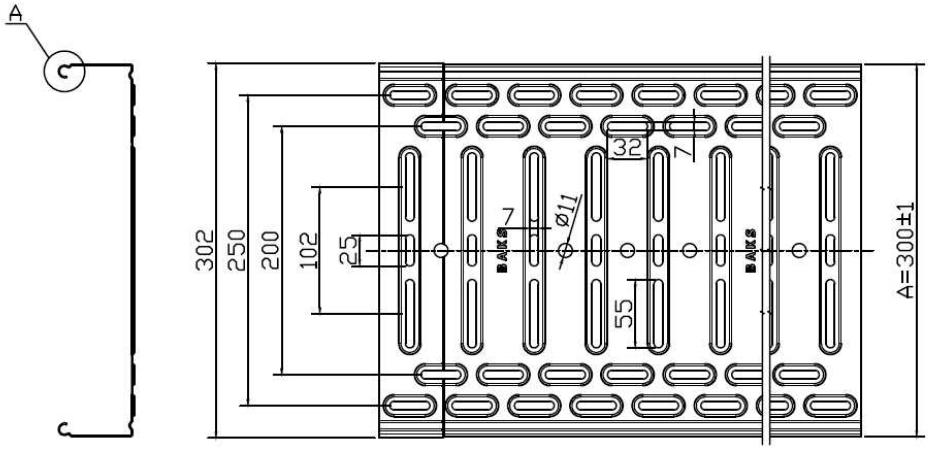
Profesjonalne Systemy Tras Kablowych

DRAWINGS

Typ	Szerokość A(mm)	Długość L(mm)
KGDL100H60/3	100	3000
KGDL200H60/3	200	3000
KGDL300H60/3	300	3000



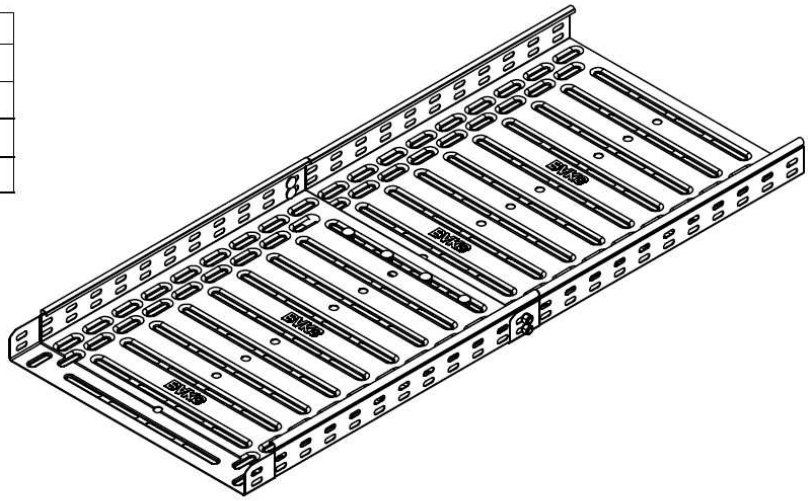


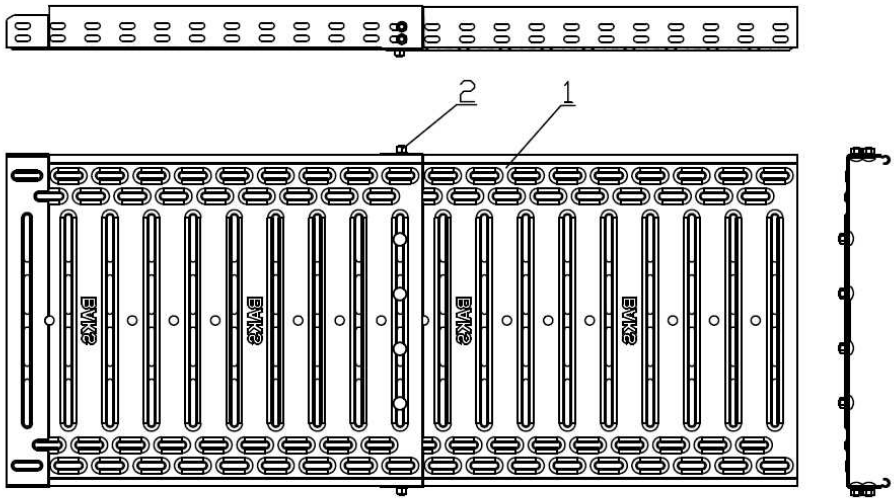


	Odchyłka wymiarów) nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:5	Format A4
			Nr normy				Arkusz
			półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: KGDL300H60/3			
Rysował							
Sprawdził							
Zatwierdził				Nr programu maszynowego			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nr rysunku			

DRAWINGS

Poz.1		Poz.2
A	Typ	Ilość
100	KGDL100H60/3	6
200	KGDL200H60/3	7
300	KGDL300H60/3	8





Lp.	Nazwa	Symbol	Materiał	Szt.	Nr katalogowy
2	Śruba z łbem grzybkowym	SGN M6x12		8	
1	Korytko	KGDL300H60/3		2	

Odchyłka wymiarów nietolerowanych

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

Masa [kg]

Podziałka

Format A4; Arkusz 1; Arkuszy 1

Projektował

Rysował

Sprawdził

Zatwierdził

Nazwisko

Podpis

Data

Nazwa rysunku: Połączenie KGDL300H60/3

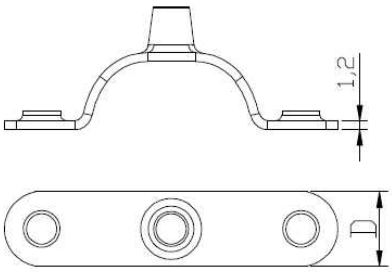
Nr programu maszynowego

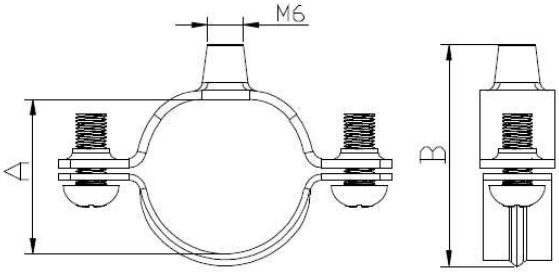
Nr rysunku

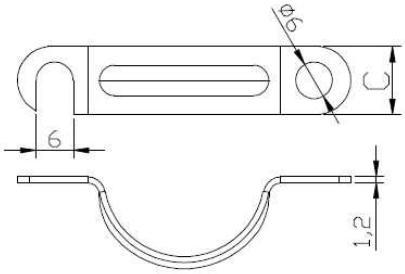
Nr zmiany

Profesjonalne Systemy Tras Kablowych

DRAWINGS



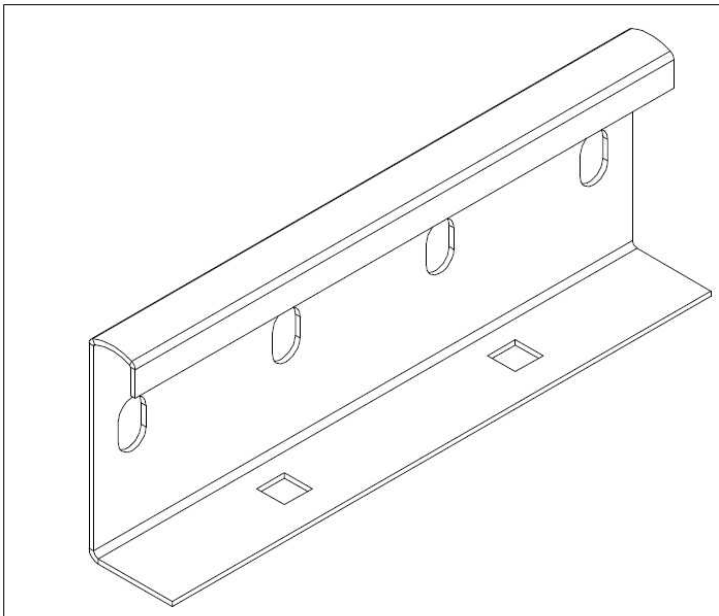


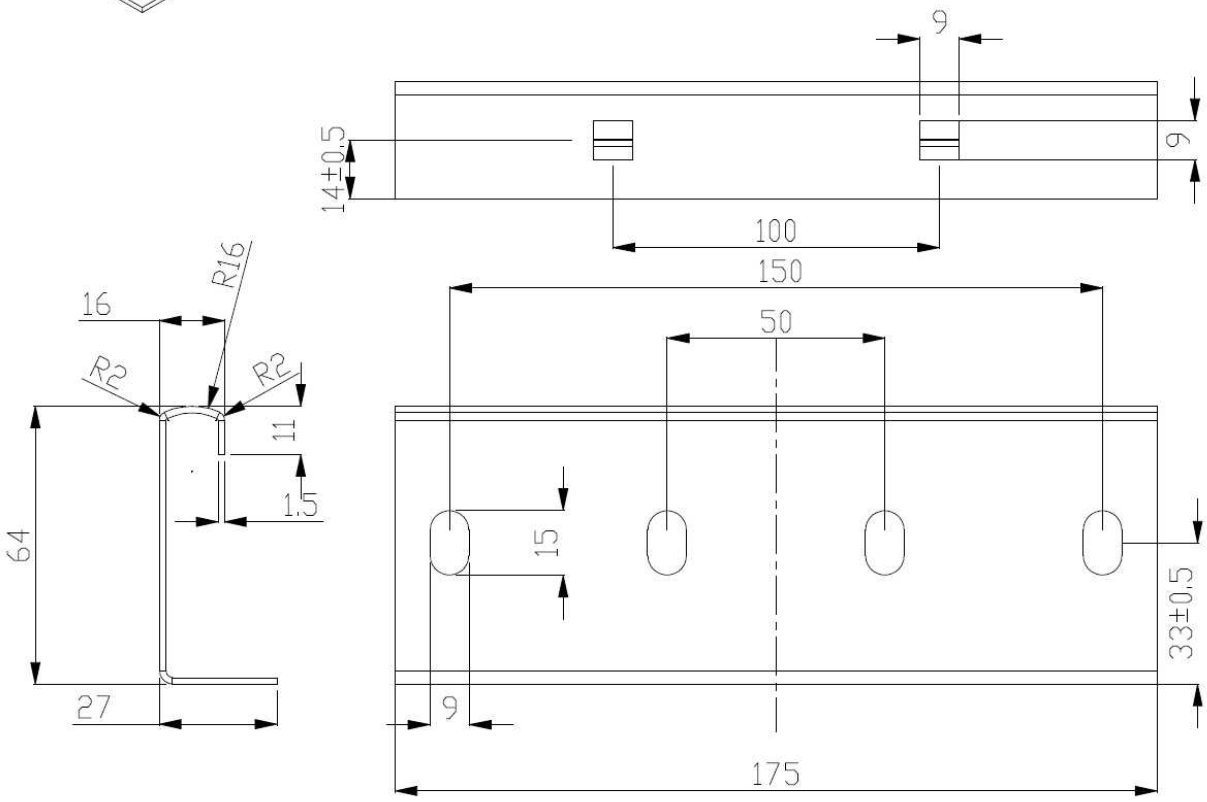


symbol	A	B	C	D
KSA 6	5	9	11	12
KSA 8	7	15	11	12
KSA 10	9	17	11	12
KSA 12	11	19	11	12
KSA 14	13	22	11	12
KSA 16	15	24	11	12
KSA 18	17	26	11	12
KSA 20	19	27	11	12
KSA 22	21	29	11	14
KSA 24	23	31	11	14
KSA 25	24	32	11	14
KSA 26	25	33	11	14
KSA 28	27	35	11	14
KSA 32	31	39	11	14
KSA 33	32	40	12	16
KSA 35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

Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:1	Format A4
		Nr normy				Arkusz 1
		półfabrykat (nr normy)				Arkuszy 1
Projektował	J.GROCHOWSKI		20.10.04	Nazwa rysunku: KSA		
Rysował	J.GROCHOWSKI		20.10.04			
Sprawdził	T.WŁODARCZYK		20.10.04			
Zatwierdził	J.KLICZEK		20.10.04	Nr programu maszynowego: ---		Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku: ---		

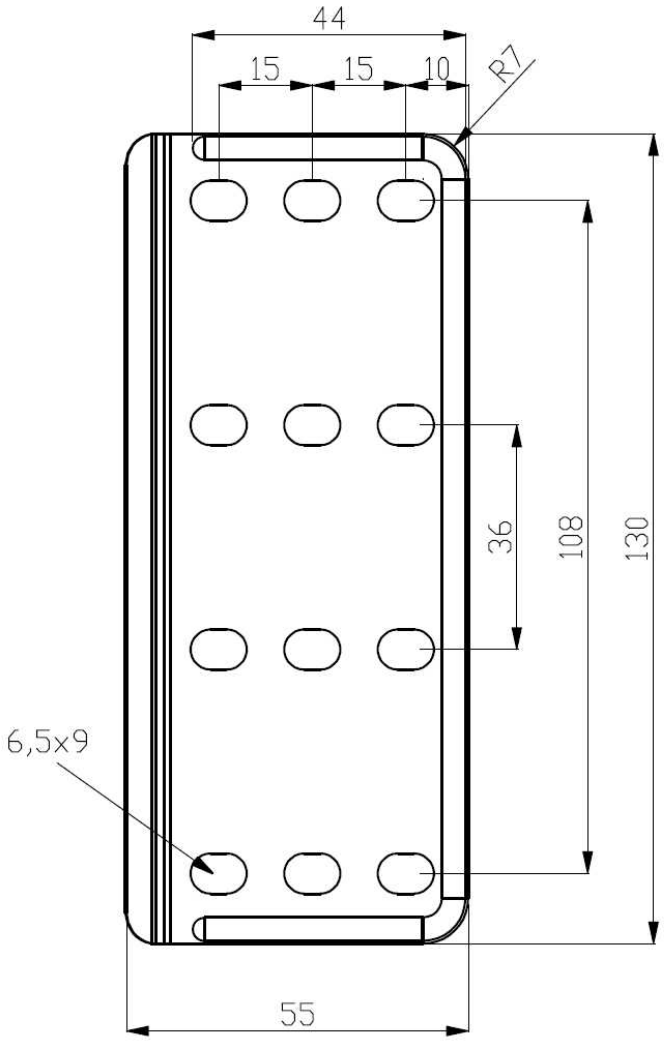
DRAWINGS

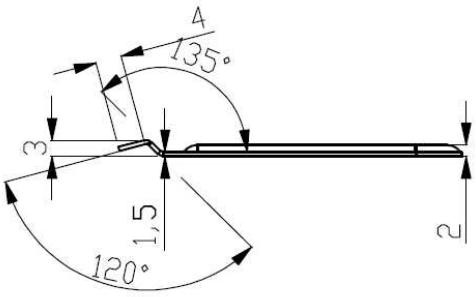




	Odchyłka wymiarów nieotolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy				Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	J.GROCHOWSKI		Data	20.10.05	Nazwa rysunku	LDOCH60N		
Rysował	J.Grochowski	Podpis		20.10.05				
Sprawdził	T.WŁODARCZYK			20.10.05				
Zatwierdził	J.KLICZEK			20.10.05	Nr programu		Nr zmiany	
	Profesjonalne Systemy Tras Kablowych				Nr wyrobu			

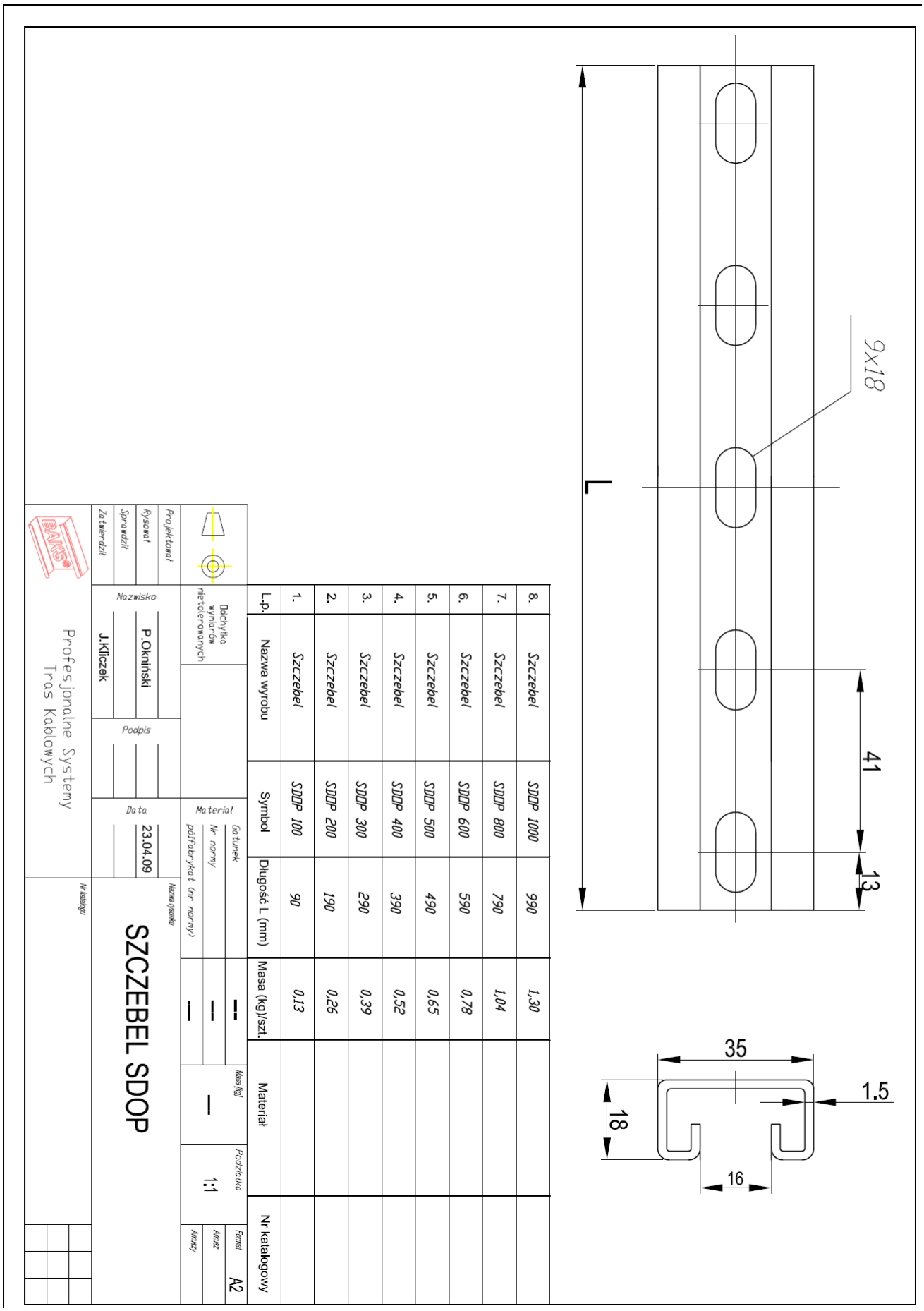
DRAWINGS





	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:1	Format A4
			Nr normy				Arkusz
			półfabrykat (nr normy)				Arkuszy
Projektował	J.GROCHOWSKI		Data	Nazwa rysunku: LPOPH60N			
Rysował	J.Grochowski	Podpis					
Sprawdził	T.WŁODARCZYK						
Zatwierdził	J.KLICZEK			Nr programu maszynowego			Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku			

DRAWINGS



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		

Dokładność wymiarów nietolerowanych

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

Masa (kg): —

Podziałka: 1:1

Format: A2 — Arkusz — Arkuszy

Projektował
Rysował
Sprawdził
Zatwierdził

Nazwisko: P.Okniński, J.Kliczek

Podpis

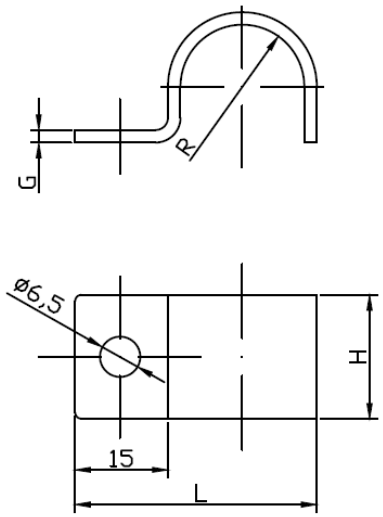
Data: 23.04.09

Profesjonalne Systemy Tras Kablowych

Nazwa rysunku: SZCZEBEL SDOP

Nr katalogu

DRAWINGS



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		Masa [kg]	Podziałka	Format A4
		Nr normy	PN-EN 10327:2005	---	1:1	Arkusz --
		półfabrykat (nr normy)	-----			Arkuszy --

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	Jacek Grochowski		20.10.05	UDF 5-43
Rysował	Jakub Rudak		20.02.08	
Sprawdził	Jacek Kliczek		20.02.08	
Zatwierdził	Jacek Kliczek		20.02.08	Nr zmiany

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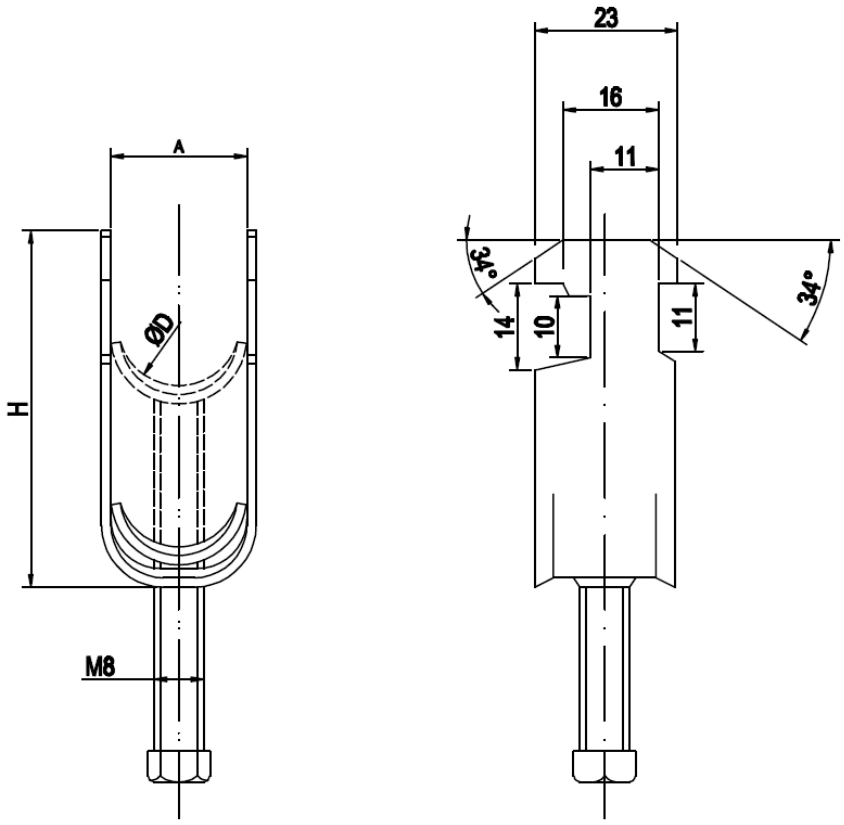
Profesjonalne Systemy Tras Kablowych

Nr rysunku 4055.....

DRAWINGS



SYMBOL	A	H	ØD
UKO1/64-70	72	116	70
UKO1/58-64	66	103	64
UKO1/46-52	54	97	52
UKO1/40-46	48	86	46
UKO1/34-40	42	78	40
UKO1/28-34	36	71	34
UKO1/22-28	30	61	28
UKO1/16-22	24	57	22

Dachyźka wymiarów nietolerowanych

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

Masa [kg]: —

Podziałka: 1:1

Format: A4; Ilość: 1; Arkuszy: 1

Projektował; Rysował: P.Dkrliński; Sprawdził; Zatwierdził: J.Kilczek

Data: 20.07.2009; 20.07.2009

Nazwa rysunku: UKO1

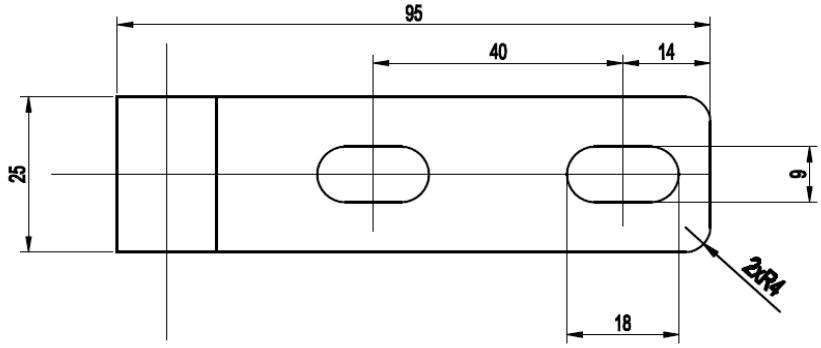
Nr programu maszynowego: —

Nr zamiany

Nr rysunku

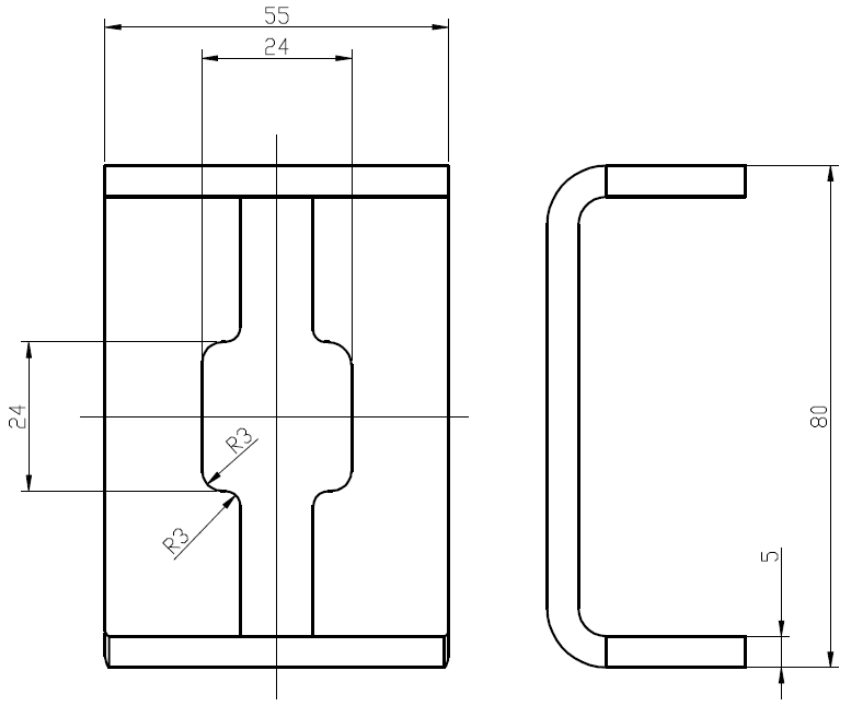
Profesjonalne Systemy Tras Kablowych

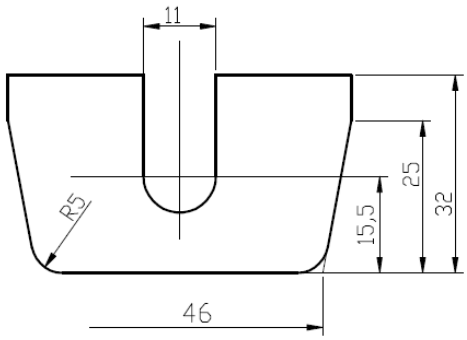
DRAWINGS



	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: UPW[]			
Rysował	J.Grochowski		—				
Sprawdził	J.Kilczek		—				
Zatwierdził	J.Kilczek		—	Nr programu maszynowego: —			Nr zmiany
BAKS® Profesjonalne Systemy Tras Kablowych				Nr rysunku			

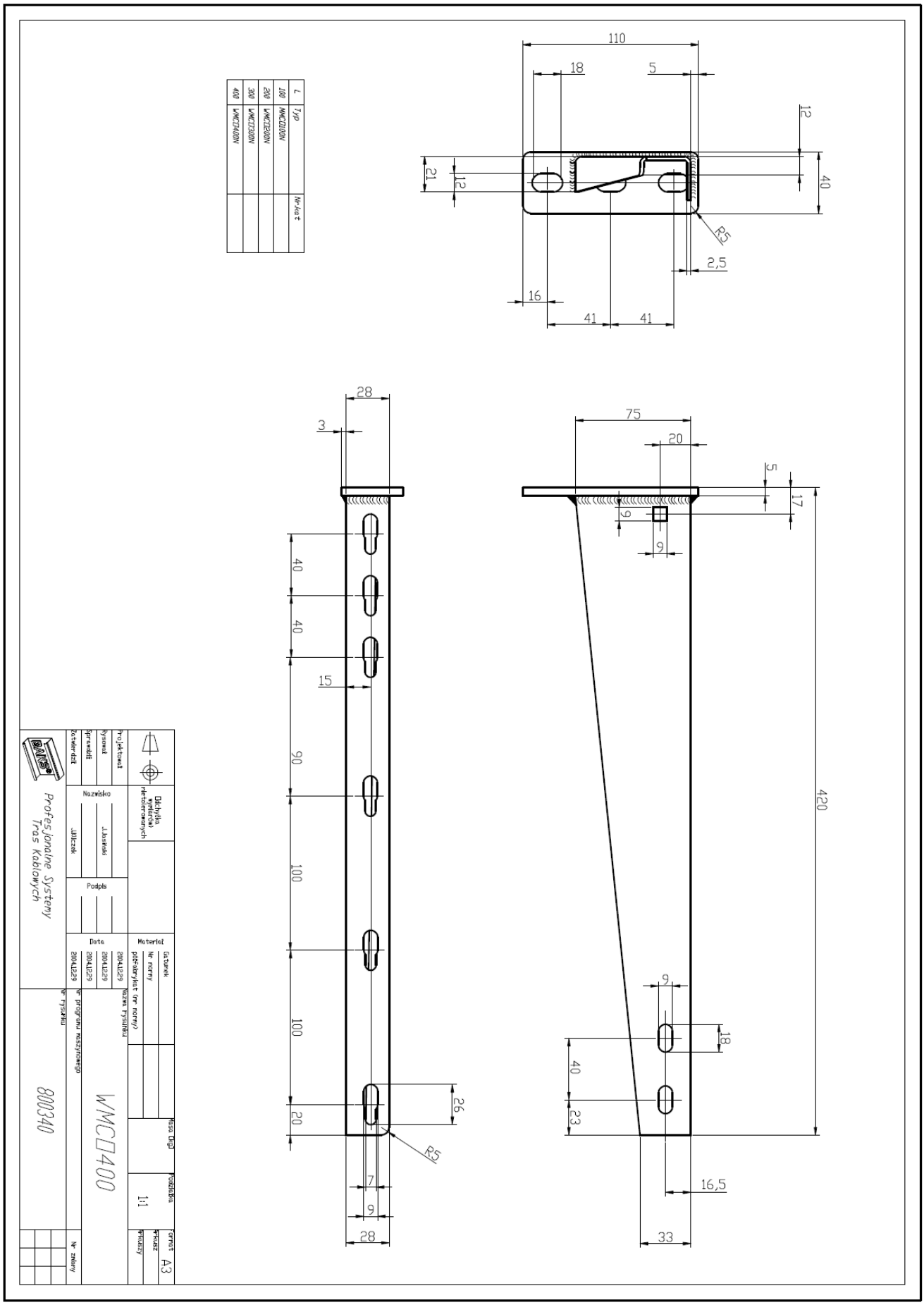
DRAWINGS



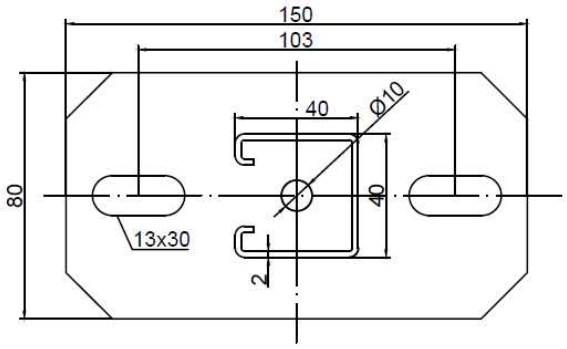


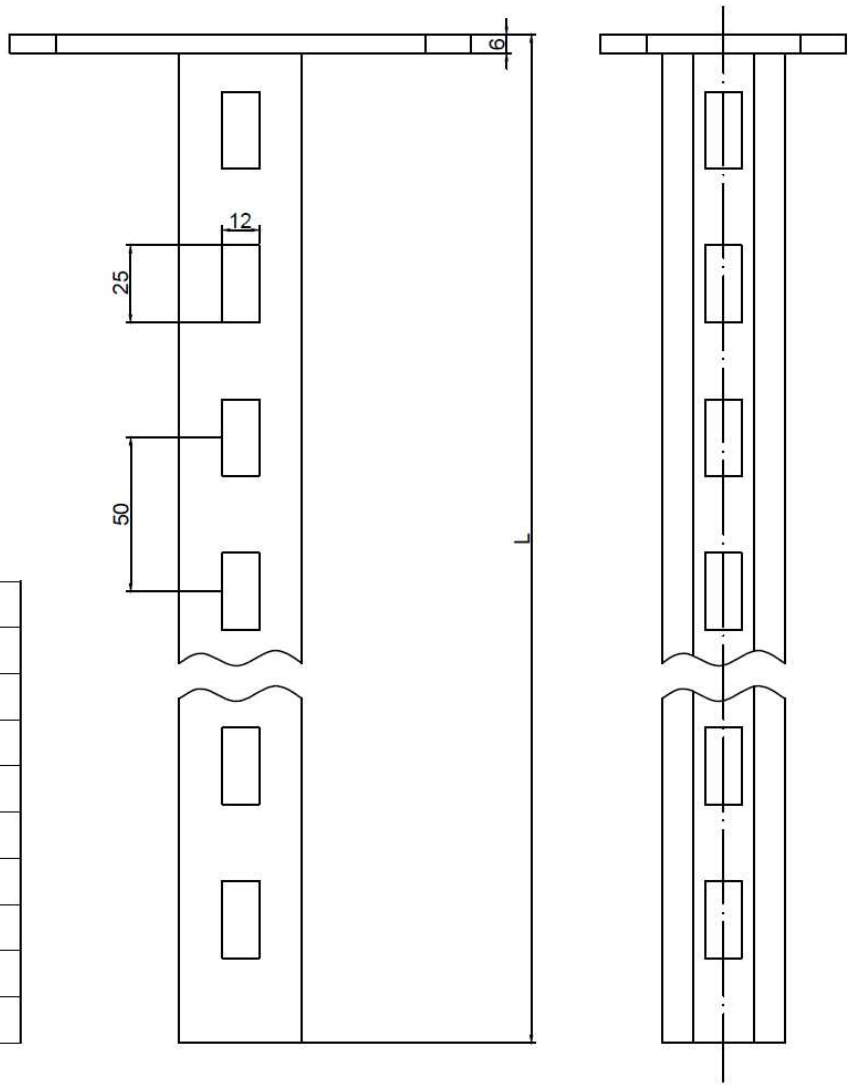
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	S235	Masa [kg]	Podziałka 1:1	Format A4
				Nr normy				Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko T.Grudniewski	Podpis	Data	2004.12.29	Nazwa rysunku USOV			
Rysował	J.Jasiński			2004.12.29				
Sprawdził	J.Kliczek			2004.12.29				
Zatwierdził	J.Kliczek			2004.12.29	Nr programu maszynowego ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych					Nr rysunku 803700			

DRAWINGS


L
Typ
Materiał
100
WMC□100N
200
WMC□200N
300
WMC□300N
400
WMC□400N
110
18
5
12
21
12
40
R5
2,5
16
41
41
28
3
40
40
15
90
100
100
20
26
R5
7
9
28
75
20
5
17
9
9
420
9
18
40
23
16,5
33
Profesjonalne Systemy Tras Kablowych
Projektował
Rysował
Sprawdził
Zatwierdził
Nazwisko
Podpis
Data
Materiał
Gatunek
Nr normy
pokrewny (nr normy)
Nazwa rysunku
Nr rysunku
800340
Nr programu maszynowego
WMC□400
Masa (kg)
Podziałka
1:1
Format
A3
Arkuszy
Nr zmiany

DRAWINGS

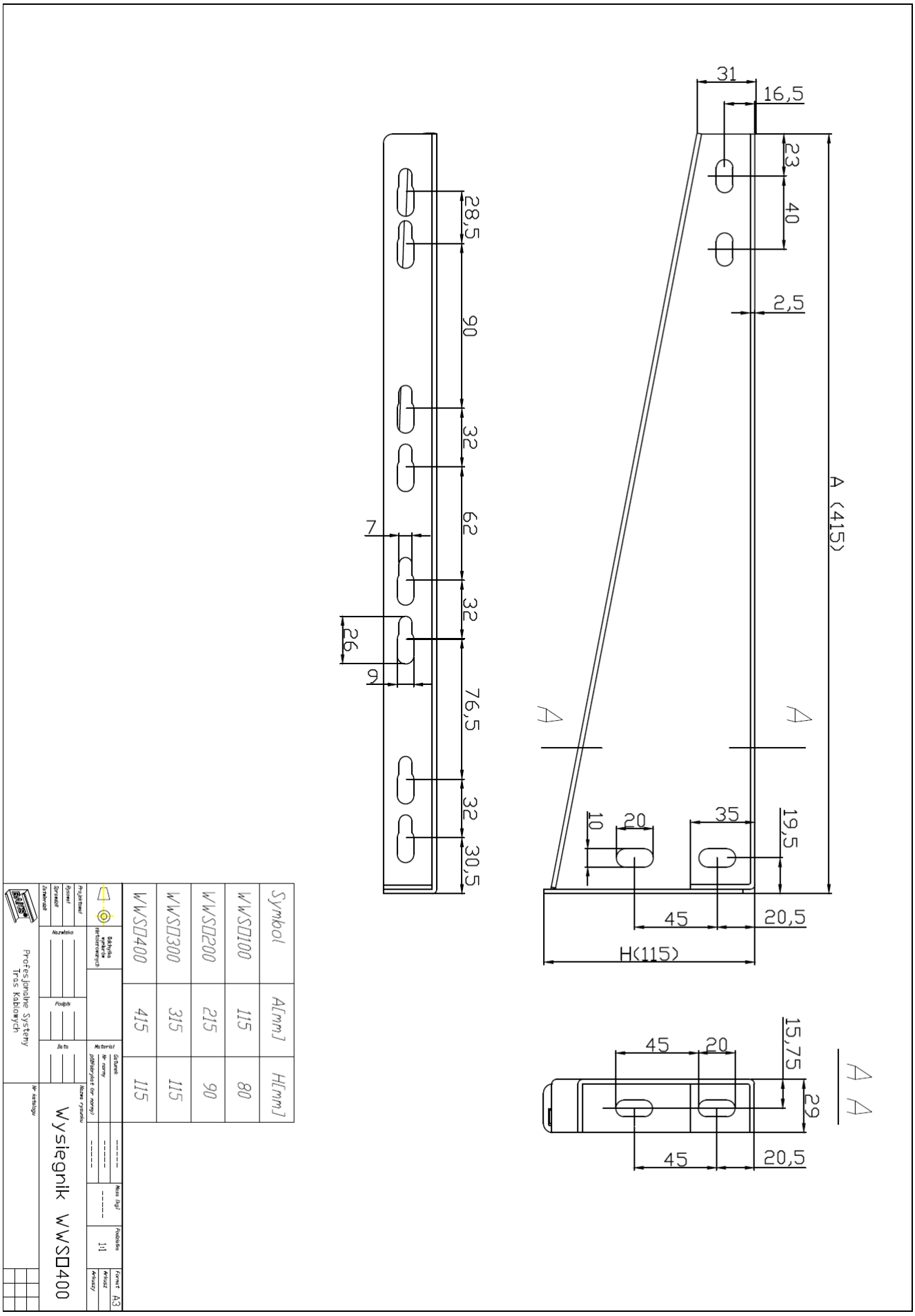




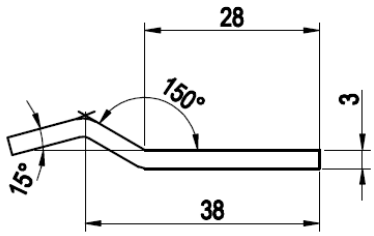
L	Typ
200	WPC□200N
300	WPC□300N
400	WPC□400N
500	WPC□500N
600	WPC□600N
700	WPC□700N
800	WPC□800N
900	WPC□900N
1000	WPC□1000N

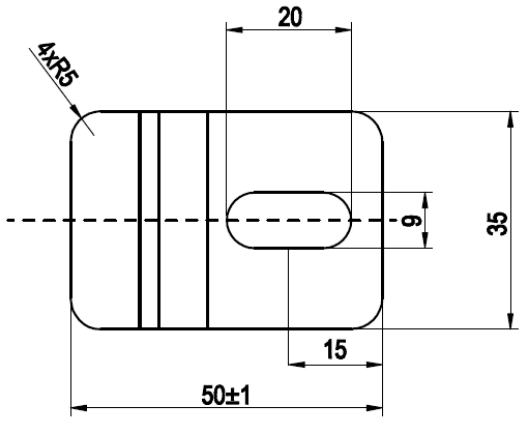
	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:1	Format A4
			Nr normy				Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: WPC□...N			
Rysował							
Sprawdził							
Zatwierdził				Nr programu maszynowego			Nr zmiany
Profesjonalne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

DRAWINGS


31
16,5
23
40
2,5
A (415)
28,5
90
32
62
32
76,5
32
30,5
7
26
9
A
A
10
20
35
19,5
45
20,5
H(115)
45
20
15,75
29
45
20,5
A A
Symbol
A[mm]
H[mm]
WWSD100
115
80
WWSD200
215
90
WWSD300
315
115
WWSD400
415
115
Profesjonalne Systemy Tras Kablowych
Wysiegnik WWSD400
Format A3
1:1

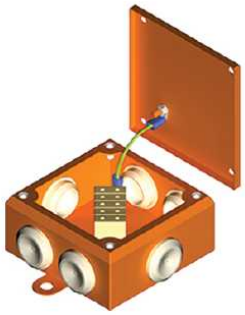
DRAWINGS





	Odchyłka wymiarów) nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka 1:1	Format A4
			Nr normy				Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku: ZMO			
Rysował	P.Oknliński		20.07.2009				
Sprawdził	J.Kilczek						
Zatwierdził	J.Kilczek			Nr programu maszynowego: ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nr rysunku			

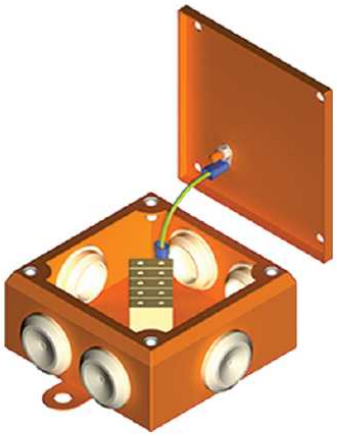
System E-30, E-90 - Puszki łączeniowe i elementy nośne



PMO1, PMO1E

ZASTOSOWANIE
Puszka łączeniowa i rozgałęźna, Ui=400 V, z trwałym zachowaniem funkcji łączenia E30 / E60 / E90 wg DIN 4102 część 12

INFORMACJA TECHNICZNA
Stosowana, jako puszka przelotowa od 0,5 mm² do 6 mm²
oraz puszka rozgałęźna od 0,5 mm² do 1,5 mm², z 5-biegunową kostką zaciskową (5 x 0,5 mm²/ 5 x 0,75 mm²/ 4 x 1 mm²/ 3 x 1,5 mm²/ 1 x 2,5 mm²/ 1 x 4 mm²/ 1 x 6 mm²)
Kostka zaciskowa wykonana jest ze specjalnej ceramiki odpornej na wysokie temperatury, dławik wykonany jest z tworzywa bezhalogenowego zakres uszczelnień od 7 do 18,5 mm

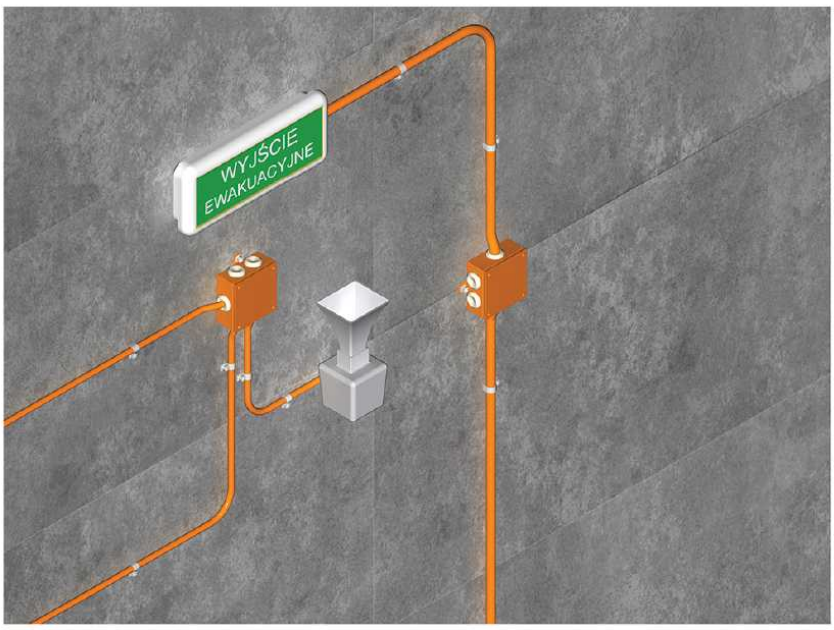


PMO2, PMO2E

ZASTOSOWANIE
Puszka łączeniowa i rozgałęźna, Ui=400 V, z trwałym zachowaniem funkcji łączenia E30 / E60 / E90 wg DIN 4102 część 12

INFORMACJA TECHNICZNA
Stosowana jako puszka przelotowa od 1,0 mm² do 10 mm² oraz puszka rozgałęźna od 1,0 mm² do 4 mm², z 5-biegunowa kostką zaciskową,
(10 x 1mm²/ 6 x 1,5 mm²/ 4 x 2,5 mm²/ 4 x 4 mm²/ 2 x 6 mm²/ 1 x 10 mm²)
Kostka zaciskowa wykonana jest ze specjalnej ceramiki odpornej na wysokie temperatury, dławik wykonany jest z tworzywa bezhalogenowego
zakres uszczelnień od 11do 24 mm

MATERIAŁ
PMO1, PMO2, - blacha stalowa, malowana proszkowo RAL 2003
PMO1E, PMO2E, - blacha kwasoodporna, 1.4303 malowana proszkowo RAL 2003
stopień ochrony IP 54
kostka zaciskowa odporna na wysokie temperatury
mocowanie poprzez zewnętrzne uchwyty montażowe



7. FINAL PROVISION

§ 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 STN EN 1363-1, and where appropriate STN 92 0205:2012. Any significant deviation with respect to size, constructional details, loads, stresses, edge 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, s.r.o., Batizovce. 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, s.r.o., Batizovce.

Approved by:

Ing. Štefan Rástocký
leader of the testing laboratory

SKÚŠOBNÉ LABORATÓRIUM • PRÜFLABORATORIUM • TESTING LABORATORY • FIRES The Experts on Fire Safety -1-

Prepared by:

Bc. Dávid Šubert
technician of the testing laboratory

8. NORMATIVE REFERENCES

STN EN 1363-1: 2001	Fire resistance tests. Part 1: General requirements
STN 92 0205:2012	Fire behaviour of construction products and building constructions.Circulit integrity maintenance of cable systems. Requirements, testing and classification.
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
ZP-27/2008 PAVUS	Test method for determination of functionality class of cables and cable loadbearing constructions - cable circuits in case of fire

THE END OF THE TEST REPORT