

TEST REPORT FIRES-FR-129-14-AUNE

**Cable bearing system BAKS with cables business Zaklady Kablowe
BITNER Celina Bitner**

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TEST REPORT

FIRES-FR-129-14-AUNE

Tested property: Function in fire
Test method: STN 92 0205: 2014 (ZP-27/2008, DIN 4102-12: 1998-11)
Type of test: Accredited
Date of issue: 17. 07. 2014

Name of the product: Cable bearing system BAKS with cables business Zakłady Kablowe BITNER Celina Bitner

Manufacturer: BAKS Kazimierz Sielski, ul. Jagodne 5, 05 – 480 Karczew, Poland
producer of cable bearing system

Zakłady Kablowe BITNER Celina Bitner, Friedleina 3/3, 30 009 Kraków,
Poland – producer of cables

Sponsor: BAKS Kazimierz Sielski, ul. Jagodne 5, 05 - 480 Karczew, Poland

Test carried out: Fires, s.r.o., Testing laboratory
Task No.: PR-14-0230
Specimens received: 30. 06. 2014
Date of the test: 03. 07. 2014

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

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1. INTRODUCTION

This test report contains the results of test carried out by laboratory of FIRES, s.r.o., Testing laboratory 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. 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 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 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, plate thermometers according to EN 1363-1 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 are used. Measurement by plate thermometers acc. to EN 1363-1 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1. Therefore, it is possible to use results of test according to STN 92 0205 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. Marcin Tokaj	Zakłady Kablowe BITNER Celina Bitner
Mr. Bartosz Nitkiewicz	Zakłady Kablowe BITNER Celina Bitner
Mr. Tomasz Latacz	Zakłady Kablowe BITNER Celina Bitner

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 54 056	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 Zakłady Kablowe BITNER Celina Bitner 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, ladders, mesh trays and clips with accessories (consoles, brackets, supports, hangers etc.) and power and communication halogen free cables of Zakłady Kablowe BITNER Celina Bitner.

Cables

Used cables by test:

Power cables:

BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	(16x)
BiTflame 1000 4x16RE FE180/E90 0,6/1kV	(4x)
BiTflame 1000 4x50RM FE180/E90 0,6/1kV	(12x)
BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	(6x)
BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV	(6x)
BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	(8x)
BiTservo® FS 4G50 FE180/E90 0,6/1kV	(8x)
BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica	(6x)
BiTservo® FS 4G50 FE180/E90 0,6/1kV mica	(6x)
BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica v.2	(6x)
BiTservo® FS 4G50 FE180/E90 0,6/1kV mica v.2	(6x)
NHXH 4x1,5RE FE180/E90 0,6/1kV	(9x)
NHXH 4x16RM FE180/E90 0,6/1kV	(3x)
NHXH 4x50RM FE180/E90 0,6/1kV	(6x)
NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	(2x)
NHXCH 4x50RM/25 FE180/E90 0,6/1kV	(2x)
(N)HXH 4x1,5RE FE180/E90 0,6/1kV	(6x)
(N)HXH 4x50RM FE180/E90 0,6/1kV	(6x)
(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	(2x)
(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	(2x)



Communication cables:

HTKSH 1x2x0,8 FE180/PH90/E90 225V	(16x)
HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	(4x)
HDGs 2x1,0 FE180/PH90/E90 300/500V	(19x)
HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	(6x)
HLGs 2x1,0 FE180/PH90/E90 300/500V	(4x)
HLGsekwf 2x1,0 FE180/PH90/E90 300/500V	(4x)

The length of cables was 5,2 m and 4,0 m from that was exposed to fire.

Cable bearing systems were made of following constructions:

Suspension tracks No. 1 – 3 and 4 – 6

Tracks are made of three consoles (WPCB1000) fixed to ceiling by anchor bolts R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Holders (UPW/UPWO) are fixed at the end of brackets with screws (SGK M8x14). Brackets are fixed through these holders by threaded rods (PG M10) with washer and nuts (M10) to ceiling by expansion anchors R-DCA-10-40. Non-standard supporting constructions.

Tracks No. 1 and 4:

Cable trays (KGJ/KGOJ400H60, steel sheet thickness 0,9 mm) fixed together by screws (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 15kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 2 and 5:

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 20kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 3 and 6:

Cable mesh trays (KDS/KDSO400H60, steel wire Ø 4,5 mm) fixed together by junctions (USS/USSO). Mesh trays are fixed to brackets by junctions (ZS/ZSO) and loaded with 20kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Suspension tracks No. 7, 8, 10 and 11

Tracks are made of three consoles (WPCB1000) fixed to ceiling by anchor bolts R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WWS/WWSO200) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by steel sheet (BR55). Non-standard supporting constructions.

Tracks No. 7 and 10:

Cable trays (KGL/KGOL200H60, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 8 and 11:

Cable ladders (DUD/DUOD200H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Suspension tracks No. 9 and 12

Tracks are made of three consoles (WPCB1000) fixed to ceiling by anchor bolts R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WWS/WWSO200) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by steel sheet (BR55). Non-standard supporting constructions.

Cable mesh trays (KDS/KDSO200H60, steel wire Ø 4,0 mm) fixed together by junctions (USS/USSO). Mesh trays are fixed to brackets by junctions (ZS/ZSO) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

**Suspension tracks No. 13, 14, 16 and 17**

Tracks are made of three consoles (WPCB1000) fixed to ceiling by anchor bolts R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WWS/WWSO200) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by steel sheet (BR55). Non-standard supporting constructions.

Tracks No. 13 and 16:

Cable trays (KGL/KGOL200H60, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 14 and 17:

Cable ladders (DUD/DUOD200H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Suspension tracks No. 15 and 18

Tracks are made of three consoles (WPCB1000) fixed to ceiling by anchor bolts R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WWS/WWSO200) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by steel sheet (BR55). Non-standard supporting constructions.

Cable mesh trays (KDS/KDSO200H60, steel wire Ø 4,0 mm) fixed together by junctions (USS/USSO). Mesh trays are fixed to brackets by junctions (ZS/ZSO) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Suspension tracks No. 19, 20 and 21, 22

Tracks are made of cable mesh trays (KDS/KDSO100H60, steel wire Ø 4,0 mm) fixed to ceiling by threaded rods (PG M8) and expansion anchors R-DCA-8-30 in spacing of 1500 mm. Cable mesh trays are fixed to threaded rods by center hangers (ZSW) and nuts (M8). Cable mesh trays are fixed together by junctions (USS/USSO) and loaded with 5kg.m⁻¹.

Suspension tracks No. 23 and 24

Tracks are made of cable trays (KGL/KGOL100H60, steel sheet thickness 0,7 mm) fixed to ceiling by threaded rods (PG M6) and expansion anchors R-DCA-6-30 in spacing of 1500 mm. Cable trays are fixed to threaded rods by center hangers (ZSW) and nuts (M6). Cable trays are fixed together by screws (SGK M6x12) and loaded with 10kg.m⁻¹.

Ceiling track No. 25

Track is made of single cable clips (UDF) fixed to ceiling by anchors (MND Ø6 x 45) mm in spacing of 600 mm.

Ceiling track No. 26

Track is made of single cable clips (UDF) fixed to ceiling by anchors (SRO M6x30) in spacing of 600 mm. Cables are connected to fireboxes (PMO3).

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 C 16/20, 150 mm thick – 4 pieces.

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	20,9
standard deviation	0,8

Relative air humidity [%]

mean	53,8
standard deviation	5,7

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 3000) 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 O₂) 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:

Relative air humidity [%]	Ambient air temperature [°C]
53,7	21,7

5.3 RESULTS OF THE TEST

Measured values are stated in this test report.

During the test there was no failure or damage of tracks – even during cooling down of the tracks after termination of the test.



6. CLOSING

Evaluation of the test:

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
1	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	23	90 minutes no failure / interruption
	2 cables BiTflame 1000 4x16RE FE180/E90 0,6/1kV		
2	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV	20	90 minutes no failure / interruption
	2 cables NHXH 4x16RE FE180/E90 0,6/1kV		
3	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	19	90 minutes no failure / interruption
	2 cables BiTflame 1000 4x16RE FE180/E90 0,6/1kV		
4	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV	18	90 minutes no failure / interruption
	2 cables NHXH 4x50RM FE180/E90 0,6/1kV		
5	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV	17	90 minutes no failure / interruption
	2 cables NHXH 4x50RM FE180/E90 0,6/1kV		
6	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV	16	90 minutes no failure / interruption
	2 cables NHXH 4x50RM FE180/E90 0,6/1kV		
7	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	15	69 minutes
	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		
8	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	14	90 minutes no failure / interruption
	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		
9	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	13	90 minutes no failure / interruption
	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		
10	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV mica v.2	12	40 minutes
11	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV mica v.2		13 minutes
12	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV mica v.2	11	71 minutes
13	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV mica v.2		13 minutes
14	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV mica v.2	10	90 minutes no failure / interruption
15	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV mica v.2		40 minutes
16	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV	9	90 minutes no failure / interruption
17	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
18	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	8	90 minutes no failure / interruption
19	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
20	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	7	90 minutes no failure / interruption
21	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
22	cable NHXH 4x16RM FE180/E90 0,6/1kV + fireboxes PMO3	26	90 minutes no failure / interruption
23	cable NHXH 4x1,5RE FE180/E90 0,6/1kV + fireboxes PMO3		90 minutes no failure / interruption
24	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV	25	73 minutes
	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV		
25	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV mica	6	23 minutes
26	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV mica		34 minutes
27	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV		43 minutes
28	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV		5 minutes
29	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV mica	5	27 minutes
30	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV mica		38 minutes
31	2 cables BiTservo [®] FS 4G50 FE180/E90 0,6/1kV		48 minutes
32	2 cables BiTservo [®] FS 4G1,5 FE180/E90 0,6/1kV		50 minutes



Specimen No.		Cables	Track No.	Time to first failure / interruption of conductor
33	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica		4	57 minutes
34	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica			70 minutes
35	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV			82 minutes
36	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV			90 minutes no failure / interruption
37	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		3	90 minutes no failure / interruption
38	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV			90 minutes no failure / interruption
39	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV			90 minutes no failure / interruption
40	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV			90 minutes no failure / interruption
41	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		2	82 minutes
	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV			
42	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV			90 minutes no failure / interruption
43	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV			90 minutes no failure / interruption
44	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		1	90 minutes no failure / interruption
45	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV			41 minutes
46	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV			90 minutes no failure / interruption
47	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV			90 minutes no failure / interruption
48	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		25	90 minutes no failure / interruption
49	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV			90 minutes no failure / interruption
50	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV			90 minutes no failure / interruption
51	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV			90 minutes no failure / interruption
52	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	24	90 minutes no failure / interruption
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
53	A	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	B	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
54	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	22	90 minutes no failure / interruption
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
55	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V			90 minutes no failure / interruption
56	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V			90 minutes no failure / interruption
57	2 cables HLGsekwf 2x1,0 FE180/PH90/E90 300/500V		21	90 minutes no failure / interruption
58	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V			90 minutes no failure / interruption
59	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V			90 minutes no failure / interruption
60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V			90 minutes no failure / interruption
61	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		18, 15	90 minutes no failure / interruption
62	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		17, 14	90 minutes no failure / interruption
63	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		16, 13	52 minutes
64	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		12, 9	44 minutes
65	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		11, 8	38 minutes
66	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		10, 7	56 minutes
67	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + fireboxes PMO3		26	90 minutes no failure / interruption
68	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		6	90 minutes no failure / interruption
69	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		5	10 minutes
70	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		4	48 minutes
71	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		3	90 minutes no failure / interruption
72	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		2	90 minutes no failure / interruption
73	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		1	90 minutes no failure / interruption
74	2 cables HLGsekwf 2x1,0 FE180/PH90/E90 300/500V		25	90 minutes no failure / interruption
75	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V			90 minutes no failure / interruption



The fire test was discontinued in 93rd 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 t [min]	Temperature [°C]											Deviation d _e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	28,8	27,3	26,4	28,1	28,9	29,5	28,9	27,7	28,2	20,0	21,7	0,0	17,9
5	569,0	568,3	556,4	573,7	568,4	609,0	579,0	562,4	573,3	576,0	21,8	-4,5	19,6
10	657,7	669,3	665,3	676,3	632,3	678,4	683,2	648,8	663,9	678,0	21,8	1,2	19,8
15	754,9	737,1	750,5	758,2	742,1	779,5	779,3	746,3	756,0	739,0	21,9	1,6	17,9
20	797,2	772,8	791,0	799,5	771,9	808,8	826,1	781,5	793,6	781,0	21,9	1,7	17,5
25	834,5	804,5	826,8	828,7	804,7	850,4	852,9	815,8	827,3	815,0	22,0	1,5	18,8
30	864,6	833,7	857,8	863,7	835,9	880,4	893,6	846,9	859,6	842,0	22,0	1,5	19,0
35	863,7	853,5	864,9	873,4	843,0	892,3	893,3	854,0	867,3	865,0	22,1	1,5	19,7
40	875,2	891,4	872,8	883,6	905,1	902,2	875,7	889,0	886,9	885,0	22,1	1,3	19,9
45	885,1	907,3	890,1	898,2	910,8	914,8	889,0	900,5	899,5	902,0	22,2	1,1	18,9
50	898,5	920,4	909,8	915,0	914,8	916,5	909,5	912,3	912,1	918,0	22,2	0,9	19,9
55	895,9	920,7	910,1	916,7	904,0	915,3	912,7	907,1	910,3	932,0	22,3	0,6	19,6
60	932,6	946,9	932,4	952,2	941,6	950,2	957,5	937,0	943,8	945,0	22,4	0,5	18,9
65	942,5	955,0	941,0	957,1	944,1	950,2	959,2	942,6	949,0	957,0	22,4	0,4	17,7
70	959,5	949,3	933,2	954,9	992,4	976,5	960,4	962,8	961,1	968,0	22,5	0,2	18,5
75	970,5	962,3	942,6	967,7	997,0	981,1	973,0	969,8	970,5	979,0	22,5	0,1	18,5
80	992,1	988,8	971,1	997,1	1000,4	1001,0	1005,4	985,8	992,7	988,0	22,5	0,1	19,1
85	1002,5	997,5	980,0	1005,4	1009,2	1007,8	1013,3	994,6	1001,3	997,0	22,6	0,2	17,1
90	1010,2	1007,0	987,7	1013,9	1017,9	1018,4	1020,7	1002,8	1009,8	1006,0	22,7	0,2	18,5
91	1012,3	1008,1	991,5	1015,6	1018,5	1018,5	1023,0	1005,0	1011,6	1008,0	22,7	0,2	19,7
92	1014,5	1012,1	995,7	1020,3	1017,0	1019,8	1028,4	1006,4	1014,3	1009,0	22,7	0,2	19,8

Tave Average temperature in the test furnace calculated from plate thermometers

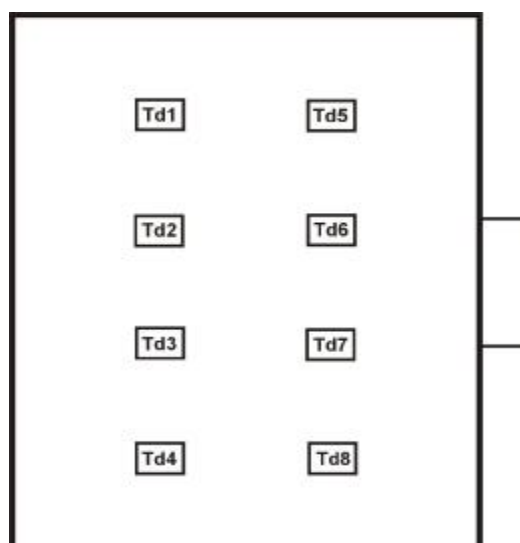
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

d_e Deviation of the average temperature from the standard temperature calculated according to test guideline

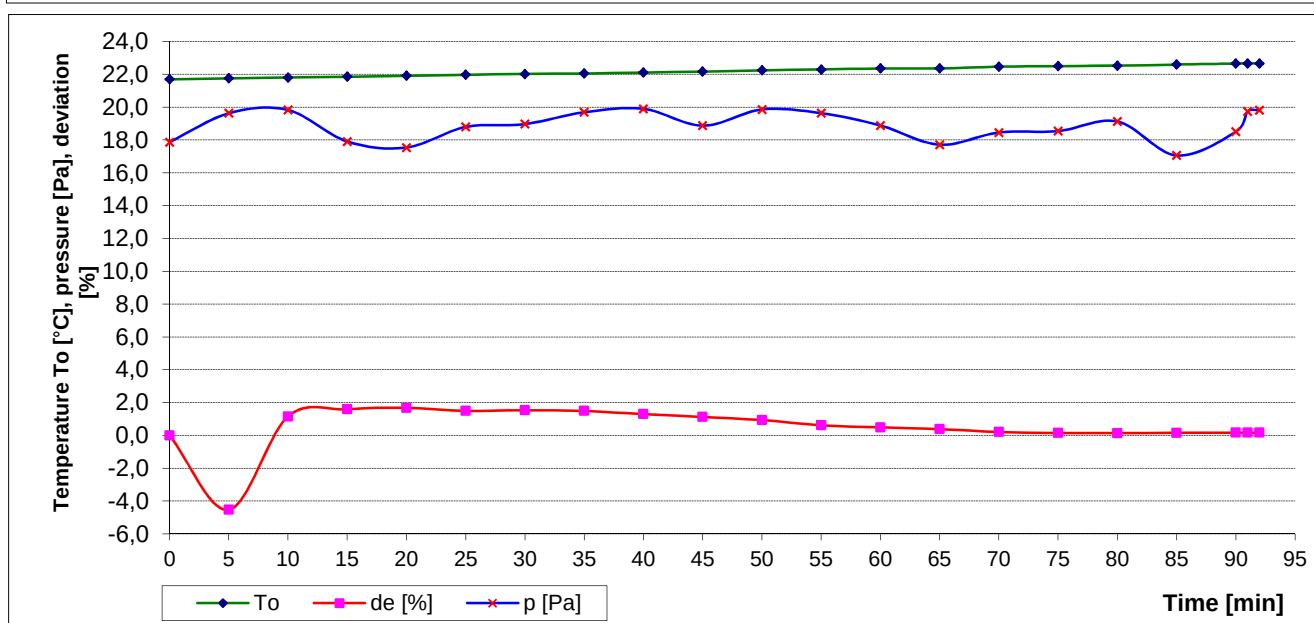
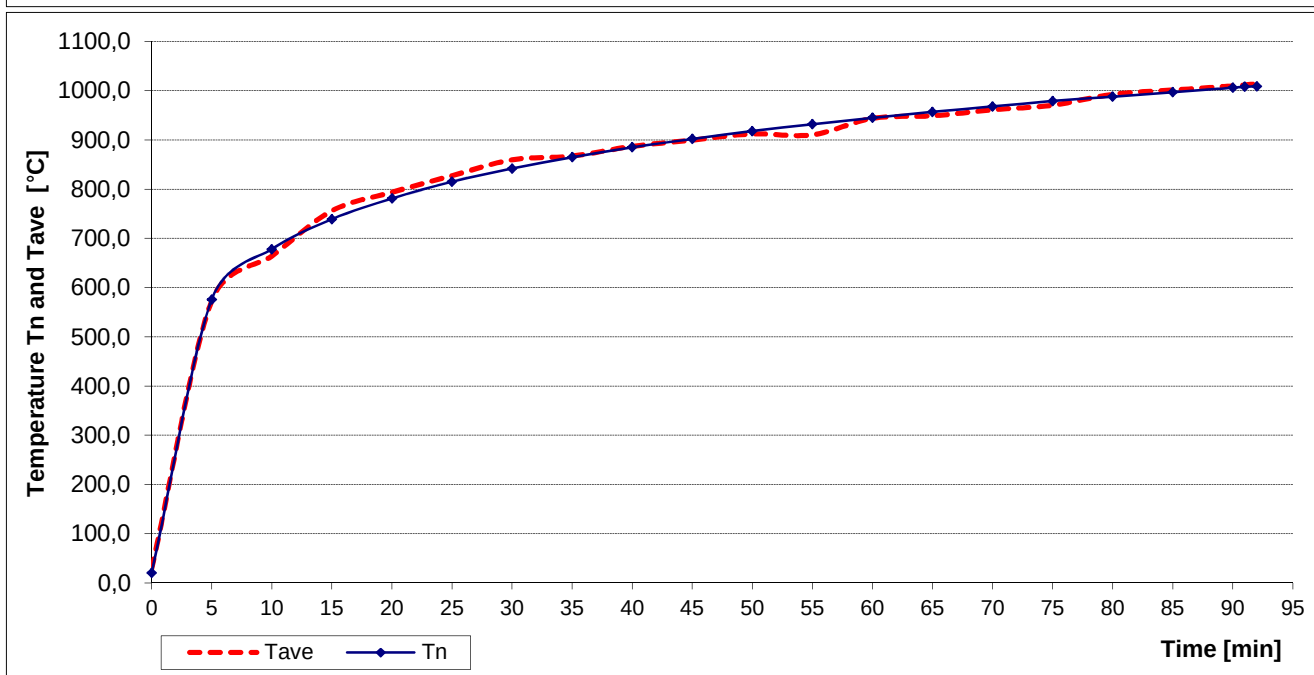
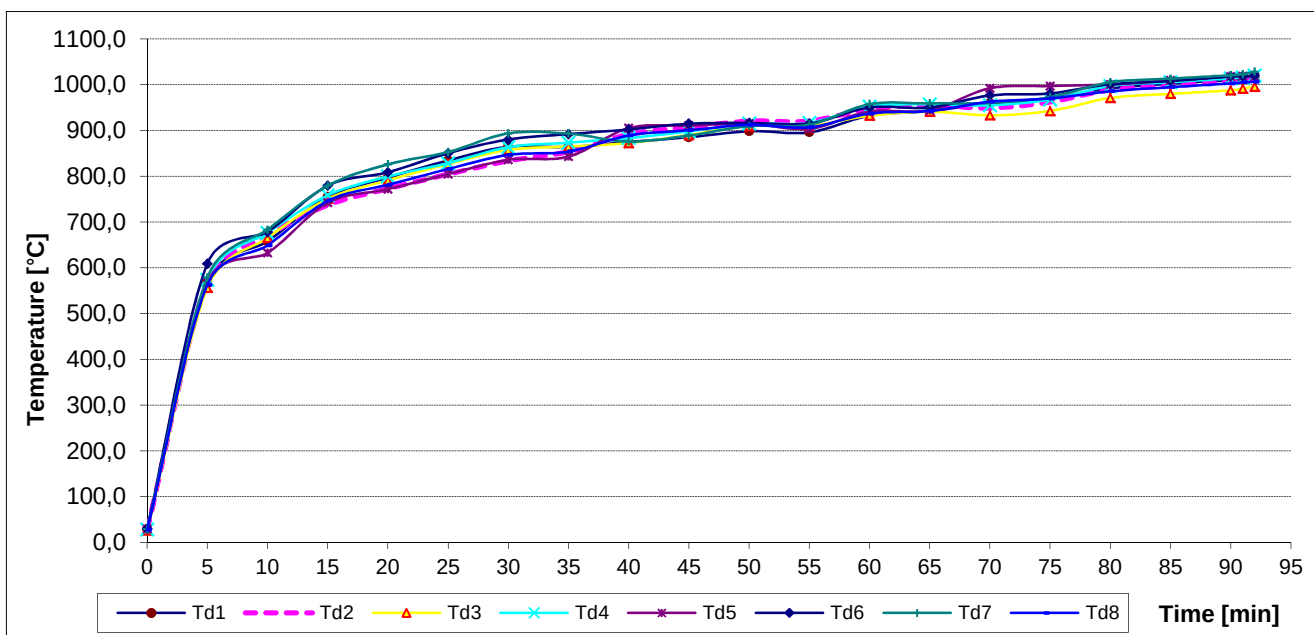
p Pressure inside the test furnace measured under the ceiling of the test furnace

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	x
	26-L2	69:57
	27-L3	x
	28-PEN	x
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	40:57
	38-L2	x
	39-L3	x
	40-PEN	x

Specimen No.	Cables
1, 3	2 cables BITflame 1000 4x1,5RE FE180/E90 0,6/1kV
	2 cables BITflame 1000 4x16RE FE180/E90 0,6/1kV
2	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV
	2 cables NHXH 4x16RE FE180/E90 0,6/1kV
4, 5, 6	2 cables NHXH 4x1,5RE FE180/E90 0,6/1kV
	2 cables NHXH 4x50RM FE180/E90 0,6/1kV
7, 8, 9	2 cables (N)HXXH 4x1,5RE FE180/E90 0,6/1kV
	2 cables (N)HXXH 4x50RM FE180/E90 0,6/1kV
10	2 cables BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v.2

- 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 S11 to S20 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S11	41-L1	13:54
	42-L2	x
	43-L3	x
	44-PEN	x
S12	45-L1	71:28
	46-L2	x
	47-L3	x
	48-PEN	x
S13	49-L1	13:41
	50-L2	x
	51-L3	x
	52-PEN	x
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	40:37
	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	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica v.2
12	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica v.2
13	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica v.2
14	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica v.2
15	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica v.2
16	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV
17	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
18	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
19	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
20	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV

- 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	x
	94-L2	73:22
	95-L3	x
	96-PEN	x
S25	97-L1	x
	98-L2	x
	99-L3	23:43
	100-PEN	x
S26	101-L1	x
	102-L2	x
	103-L3	34:45
	104-PEN	x
S27	105-L1	x
	106-L2	x
	107-L3	43:42
	108-PEN	x
S28	109-L1	x
	110-L2	x
	111-L3	5:57
	112-PEN	x
S29	113-L1	27:27
	114-L2	x
	115-L3	x
	116-PEN	x
S30	117-L1	x
	118-L2	x
	119-L3	38:22
	120-PEN	x

Specimen No.	Cables
21	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
22	cable NHXH 4x16RM FE180/E90 0,6/1kV + fireboxes PMO3
23	cable NHXH 4x1,5RE FE180/E90 0,6/1kV + fireboxes PMO3
24	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV
	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV
25	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica
26	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica
27	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV
28	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV
29	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica
30	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica

- 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 S31 to S40 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	x
	122-L2	48:50
	123-L3	x
	124-PEN	x
S32	125-L1	x
	126-L2	50:54
	127-L3	50:54
	128-PEN	x
S33	129-L1	57:41
	130-L2	x
	131-L3	57:41
	132-PEN	x
S34	133-L1	x
	134-L2	x
	135-L3	70:21
	136-PEN	x
S35	137-L1	82:58
	138-L2	x
	139-L3	x
	140-PEN	x
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	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV
32	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV
33	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV mica
34	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV mica
35	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV
36	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV
37	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
38	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
39	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
40	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV

- 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 S41 to S50 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S41	161-L1	82:23
	162-L2	x
	163-L3	x
	164-PEN	x
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	41:30
	178-L2	x
	179-L3	41:30
	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

Specimen No.	Cables
41	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
42	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
43	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
44	2 cables Bitflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
45	2 cables Bitflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
46	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
47	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
48	2 cables Bitflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
49	2 cables Bitflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
50	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV

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 S51 - power cable**

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S51	201-L1	no failure / interruption
	202-L2	no failure / interruption
	203-L3	no failure / interruption
	204-PEN	no failure / interruption

Specimen No.	Cables
51	2 cables BITflame 1000 4x50RM FE180/E90 0,6/1kV

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	no failure / interruption
	210-PEN	no failure / interruption
S52B	211-L	no failure / interruption
	212-PEN	no failure / interruption
S53A	213-L	no failure / interruption
	214-PEN	no failure / interruption
S53B	215-L	no failure / interruption
	216-PEN	no failure / interruption
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S54B	219-L	no failure / interruption
	220-PEN	no failure / interruption
S55A	221-L	no failure / interruption
	222-PEN	no failure / interruption
S55B	223-L	no failure / interruption
	224-PEN	no failure / interruption
S56A	225-L	no failure / interruption
	226-PEN	no failure / interruption
S56B	227-L	no failure / interruption
	228-PEN	no failure / interruption
S57A	229-L	no failure / interruption
	230-PEN	no failure / interruption
S57B	231-L	no failure / interruption
	232-PEN	no failure / interruption
S58A	233-L	no failure / interruption
	234-PEN	no failure / interruption
S58B	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59A	237-L	no failure / interruption
	238-PEN	no failure / interruption
S59B	239-L	no failure / interruption
	240-PEN	no failure / interruption
S60A	241-L	no failure / interruption
	242-PEN	no failure / interruption
S60B	243-L	no failure / interruption
	244-PEN	no failure / interruption
S61A	245-L	no failure / interruption
	246-PEN	no failure / interruption
S61B	247-L	no failure / interruption
	248-PEN	no failure / interruption

Specimen No.	Cables
52A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V
52B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
53A, 54B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
53B, 54A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
55	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V
56	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
57	2 cables HLGsekwf 2x1,0 FE180/PH90/E90 300/500V
58	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V
59	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
61	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V

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	no failure / interruption
	250-PEN	no failure / interruption
S62B	251-L	no failure / interruption
	252-PEN	no failure / interruption
S63A	253-L	52:39
	254-PEN	x
S63B	255-L	53:35
	256-PEN	x
S64A	257-L	44:47
	258-PEN	x
S64B	259-L	no failure / interruption
	260-PEN	no failure / interruption
S65A	261-L	38:54
	262-PEN	x
S65B	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66A	265-L	56:40
	266-PEN	x
S66B	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	no failure / interruption
	270-PEN	no failure / interruption
S67B	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S68B	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69A	277-L	10:45
	278-PEN	x
S69B	279-L	10:25
	280-PEN	x
S70A	281-L	48:50
	282-PEN	x
S70B	283-L	51:32
	284-PEN	x
S71A	285-L	no failure / interruption
	286-PEN	no failure / interruption
S71B	287-L	no failure / interruption
	288-PEN	no failure / interruption

Specimen No.	Cables
62	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
63	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
64	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
65	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
66	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
67	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + fireboxes PMO3
68	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
69	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
70	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
71	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diodes 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]
S72A	289-L	no failure / interruption
	290-PEN	no failure / interruption
S72B	291-L	no failure / interruption
	292-PEN	no failure / interruption
S73A	293-L	no failure / interruption
	294-PEN	no failure / interruption
S73B	295-L	no failure / interruption
	296-PEN	no failure / interruption
S74A	297-L	no failure / interruption
	298-PEN	no failure / interruption
S74B	299-L	no failure / interruption
	300-PEN	no failure / interruption
S75A	301-L	no failure / interruption
	302-PEN	no failure / interruption
S75B	303-L	no failure / interruption
	304-PEN	no failure / interruption

Specimen No.	Cables
72	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
73	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
74	2 cables HLGsekwf 2x1,0 FE180/PH90/E90 300/500V
75	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diodes 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.

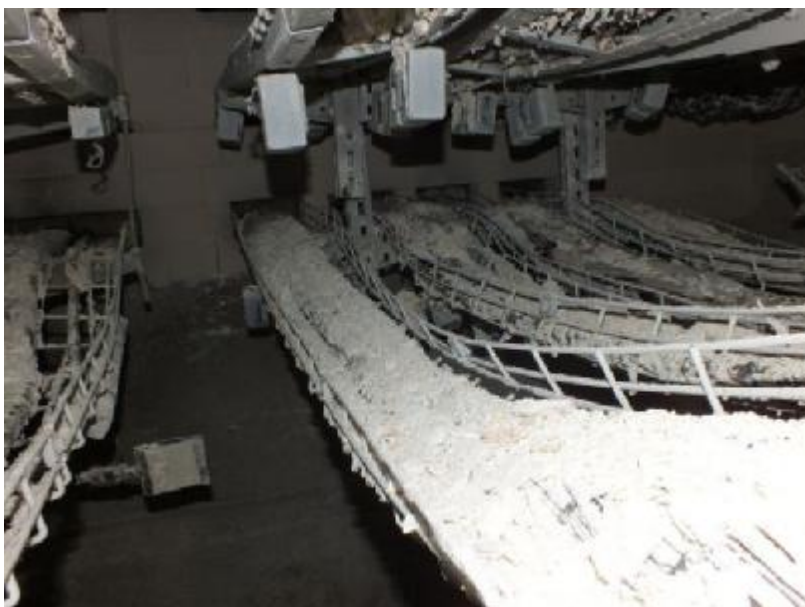
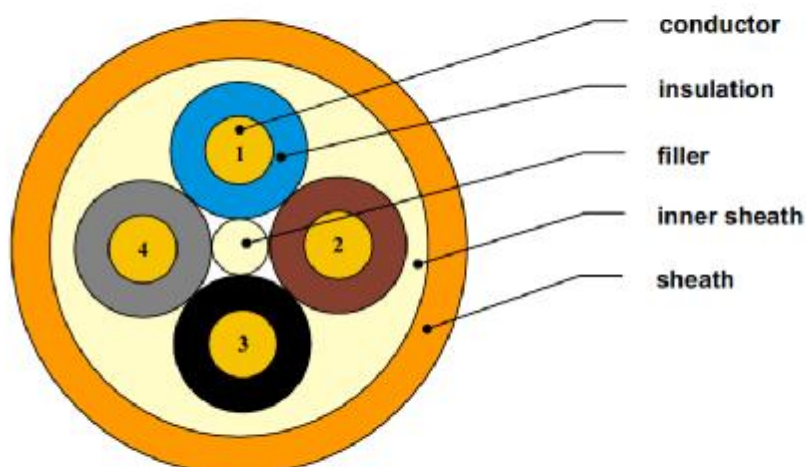


Photo taken after the test.



CABLES

(N)HXH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

(N)HXH FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 ÷ 5	1,5 ÷ 300
7 ÷ 10	1,5 ÷ 10
10 ÷ 48	1,5 ÷ 2,5

Operating voltage

0,6/1kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range
during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

E90

Combustibility tests

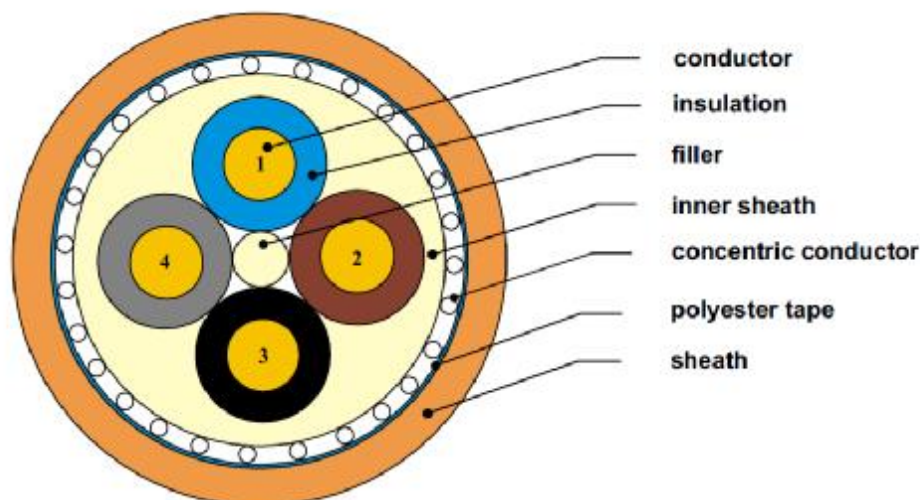
PN-EN 50226:2006, IEC 60332-3

Reference standards

DIN VDE 0266



CABLES

(N)HXCH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

(N)HXCH FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 4	1,5/1,5 + 240/120
7	1,5/1,5 + 4/4
10 + 30	1,5/2,5 + 2,5/10

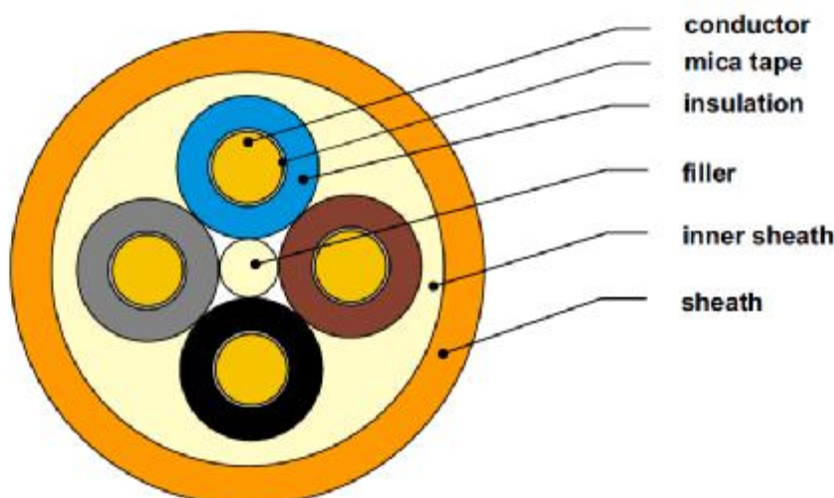
Operating voltage 0,6/1 kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90 °C, minimum 10^{12}

Operating temperature range during operation during installation -30 °C up to +90 °C
 -5 °C up to +50 °C
 Minimum bending radius
 15 x D single core
 12 x D multi core
 D = outer diameter

Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards DIN VDE 0266



CABLES

NHXX FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

NHXX FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 ÷ 5	1,5 ÷ 300
7 ÷ 10	1,5 ÷ 10
10 ÷ 48	1,5 ÷ 2,5

Operating voltage

0,6/1kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range
during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

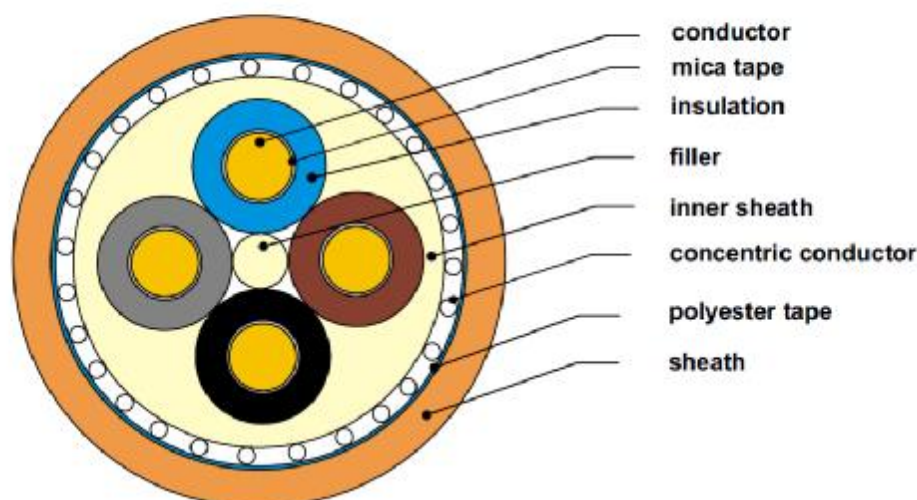
E90

PN-EN 50226:2006, IEC 60332-3

DIN VDE 0266



CABLES

NHXCH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

NHXCH FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 4	1,5/1,5 + 240/120
7	1,5/1,5 + 4/4
10 + 30	1,5/2,5 + 2,5/10

Operating voltage

0,6/1 kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range
during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

E90

Combustibility tests

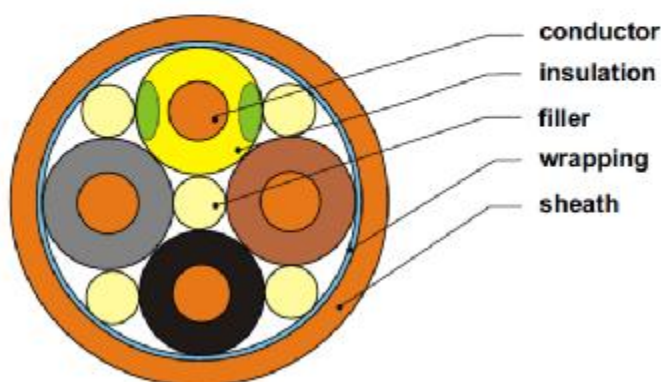
PN-EN 50226:2006, IEC 60332-3

Reference standards

DIN VDE 0266



CABLES

BiTflame 1000 FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to EN 60228 or IEC 60228

insulation - mica tape and cross-linked halogen free forming polymer compound

filler - flame resistant, halogen free polymer compound (side above 16mm²)

wrapping - polyester tape

sheath - flame resistant, halogen free polymer compound

BiTflame 1000 FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 5	1,5 + 300
7 + 10	1,5 + 10
10 + 48	1,5 + 2,5

Operating voltage

0,6/1kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range

during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

E90

Combustibility tests

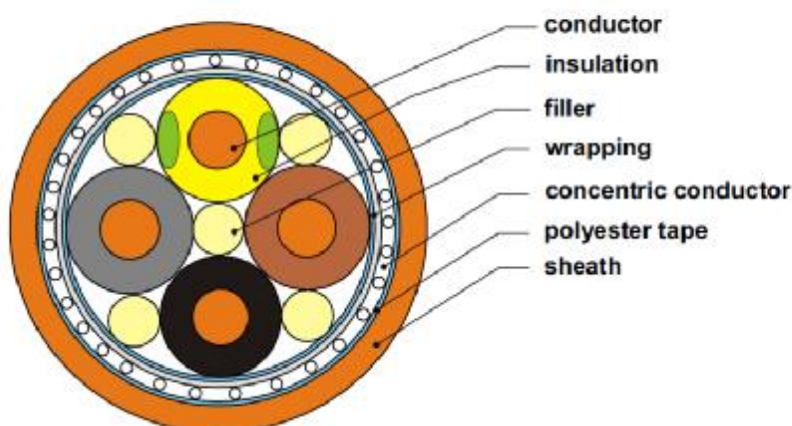
PN-EN 50226:2006, IEC 60332-3

Reference standards

ZN-CB



CABLES

BiTflame 1000C FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to EN 60228 or IEC 60228

insulation - mica tape and cross-linked halogen free forming polymer compound

filler - flame resistant, halogen free polymer compound

wrapping - polyester and glass-fibre tape

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound

BiTflame 1000C FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 4	1,5/1,5 + 240/120
7	1,5/1,5 + 4/4
10 + 30	1,5/2,5 + 2,5/10

Operating voltage 0,6/1 kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range
 during operation -30°C up to +90°C
 during installation -5°C up to +50°C
 Minimum bending radius
 15 x D single core
 12 x D multi core
 D = outer diameter

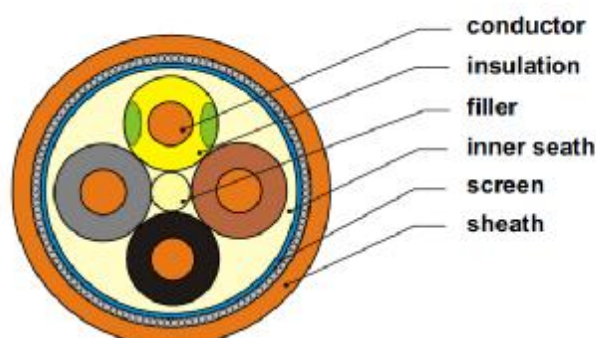
Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards ZN-CB



CABLES

BiTservo® FS FE180/E90

**FIRE RESISTANT, FLEXIBLE, HALOGEN-FREE MOTOR CONNECTION CABLES
FOR FREQUENCY CONVERTERS 0,6/1 kV**



Drawings: 6s, 7s

APPLICATIONS

Cables with a special construction, used to supply power to motors from frequency converters while maintaining full electromagnetic compatibility. The special crosslinked and insulation ensures low cable capacitance in comparison with cables with a PVC insulation. The cables are suitable for both fixed installation and movable connections in industrial equipment, process lines, and machines operating in dry and damp rooms - also in public buildings. The entire cable is made of halogen-free materials, and does not emit noxious substances during a fire. The cable is unsuited for external installations and direct underground installation.

CONSTRUCTION

conductor - flexible copper wire, class 5 as per EN 60228 or IEC 60228

insulation - crosslinked halogen free ceramic forming polymer compound

filler - flame resistant, halogen-free polymer compound

inner sheath - flame resistant, halogen-free polymer compound

screen - an electrostatic screen in the form of polyester tape covered with a layer of aluminium and a second screen in the form of tinned copper wire braid

sheath - flame resistant, halogen-free polymer compound

BiTservo® FS FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
4	1,5 + 240

Operating voltage 0,6/1 kV
Voltage test 4000 V, 50 Hz
Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range during operation during installation -30°C up to +90°C
-10°C up to +50°C
Minimum bending radius 7,5 x D - D < 20mm
10 x D - D > 20mm
D = outer diameter

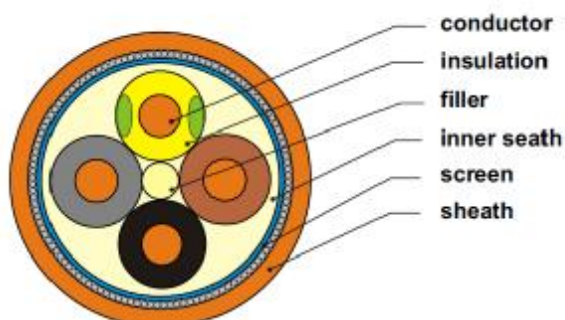
Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB



CABLES

BiTservo® FS FE180/E90

**FIRE RESISTANT, FLEXIBLE, HALOGEN-FREE MOTOR CONNECTION CABLES
FOR FREQUENCY CONVERTERS 0,6/1 kV**



Drawings: 8μ, 9μ ver. 2

APPLICATIONS

Cables with a special construction, used to supply power to motors from frequency converters while maintaining full electromagnetic compatibility. The special crosslinked and insulation ensures low cable capacitance in comparison with cables with a PVC insulation. The cables are suitable for both fixed installation and movable connections in industrial equipment, process lines, and machines operating in dry and damp rooms - also in public buildings. The entire cable is made of halogen-free materials, and does not emit noxious substances during a fire. The cable is unsuited for external installations and direct underground installation.

CONSTRUCTION

conductor - flexible copper wire, class 5 as per EN 60228 or IEC 60228

insulation - mica tape and special halogen-free polymer compound

filler - flame resistant, halogen-free polymer compound

inner sheath - flame resistant, halogen-free polymer compound

screen - an electrostatic screen in the form of polyester tape covered with a layer of aluminium and a second screen in the form of tinned copper wire braid

sheath - flame resistant, halogen-free polymer compound

BiTservo® FS FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
4	1,5 + 240

Operating voltage 0,6/1 kV
Voltage test 4000 V, 50 Hz
Insulation resistivity at 90°C,
minimum 10^{12}

Operating temperature range
during operation -30°C up to +90°C
during installation -10°C up to +50°C
Minimum bending radius
7,5 x D - D < 20mm
10 x D - D > 20mm
D = outer diameter

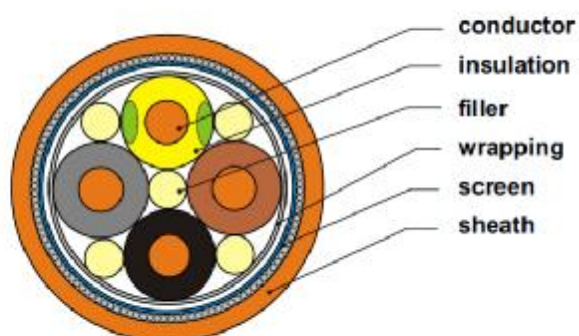
Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB



CABLES

BiTservo® FS FE180/E90

**FIRE RESISTANT, FLEXIBLE, HALOGEN-FREE MOTOR CONNECTION CABLES
FOR FREQUENCY CONVERTERS 0,6/1 kV**



Drawings: 8μ, 9μ

APPLICATIONS

Cables with a special construction, used to supply power to motors from frequency converters while maintaining full electromagnetic compatibility. The special crosslinked and insulation ensures low cable capacitance in comparison with cables with a PVC insulation. The cables are suitable for both fixed installation and movable connections in industrial equipment, process lines, and machines operating in dry and damp rooms - also in public buildings. The entire cable is made of halogen-free materials, and does not emit noxious substances during a fire. The cable is unsuited for external installations and direct underground installation.

CONSTRUCTION

conductor - flexible copper wire, class 5 as per EN 60228 or IEC 60228

insulation - mica tape and special halogen-free polymer compound

filler - flame resistant, halogen-free polymer compound

wrapping - polyester and glass-fibre tape

screen - an electrostatic screen in the form of polyester tape covered with a layer of aluminium and a second screen in the form of tinned copper wire braid

sheath - flame resistant, halogen-free polymer compound

BiTservo® FS FE180/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
4	1,5 + 240

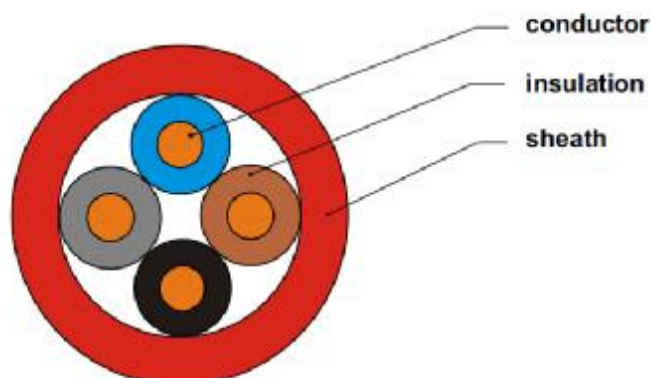
Operating voltage 0,6/1 kV
Voltage test 4000 V, 50 Hz
Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range during operation -30°C up to +90°C
during installation -10°C up to +50°C
Minimum bending radius 7,5 x D - D < 20mm
10 x D - D > 20mm
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB



CABLES

HDGs FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

sheath - flame resistant, halogen free polymer compound

HDGs FE180/PH90/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 + 5	1 + 10
6 + 37	1 + 2,5

Operating voltage 300/500 V

Voltage test 2000 V, 50 Hz
core/core 2000 V, 50 Hz
core/screen

Insulation resistivity at 90°C, minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -10°C up to +50°C

Minimum bending radius 10 x D single core
D = outer diameter

Cable combustibility

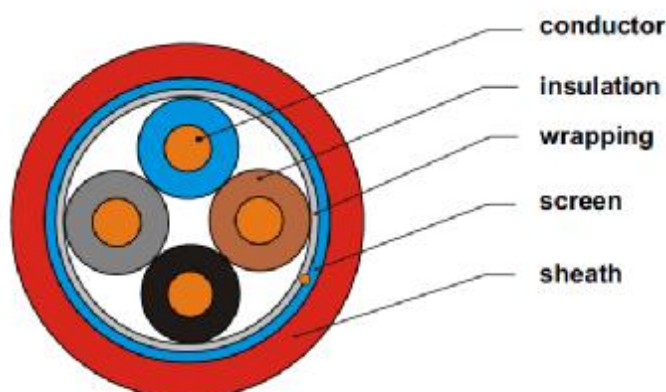
Fire resistance E90

Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3

Reference standards ZN-CB-03-2002



CABLES

HDGsekwf FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with tinned copper drain wire

sheath - flame resistant, halogen free polymer compound

HDGsekwf FE180/PH90/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V

Voltage test 2000 V, 50 Hz

core/core 2000 V, 50 Hz

Insulation resistivity at 90°C, minimum 10¹¹

Operating temperature range

during operation -30°C up to +80°C

during installation -10°C up to +50°C

Minimum bending radius 10 x D single core

D = outer diameter

Cable combustibility

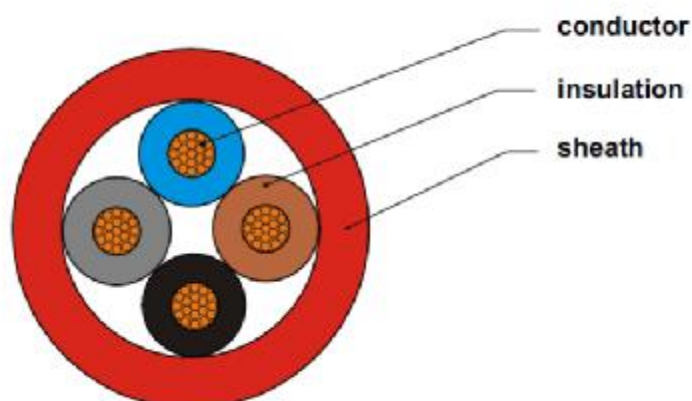
Fire resistance E90

Combustibility tests PN-EN 50200, PN-EN 50226:2006 IEC 60332-3

Reference standards ZN-CB-03-2002



CABLES

HLGs FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - multistranded copper conductor, class 5 acc. to: PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

sheath - flame resistant, halogen free polymer compound

HLGs FE180/PH90/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V
Voltage test 2000 V, 50 Hz
core/core

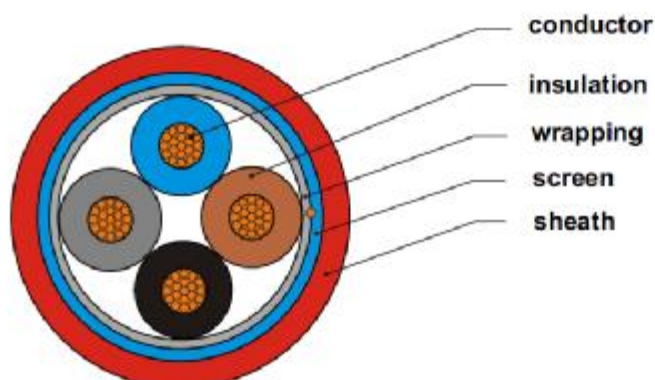
Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -10°C up to +50°C
Minimum bending radius 6 x D single core
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB-03-2002



CABLES

HLGsekwf FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - multistranded copper conductor, class 5 acc. to: PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with a tinned drain wire

sheath - flame resistant, halogen free polymer compound

HLGsekwf FE180/PH90/E90**CHARACTERISTICS**

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 + 5	1 + 10
6 + 37	1 + 2,5

Operating voltage 300/500 V

Voltage test 2000 V, 50 Hz

core/core 2000 V, 50 Hz

core/screen 2000 V, 50 Hz

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range

during operation

during installation

Minimum bending radius

-30°C up to +80°C

-10°C up to +50°C

6 x D single core

D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

E90

PN-EN 50200, PN-EN 50226:2006

IEC 60332-3

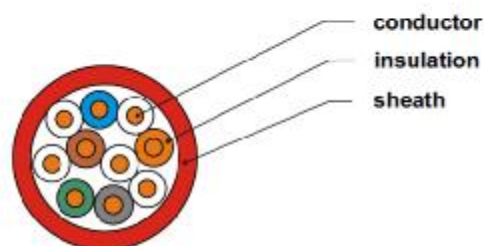
ZN-CB-03-2002



CABLES

HTKSH FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.
Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - mica tape and halogen free forming polymer compound

sheath - flame resistant, halogen free polymer compound

HTKSH FE180/PH90/E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x 20 x 2 x	0,8
1 x 2 x 10 x 2 x	1,0
1 x 2 x 10 x 2 x	1,4
1 x 2 x 10 x 2 x	1,8
1 x 2 x 10 x 2 x	2,3
1 x 2 x 10 x 2 x	2,8

Operating voltage 225V
Voltage test 1500 V, 50 Hz
core/core

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -5°C up to +50°C
Minimum bending radius

10 x D single core
D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

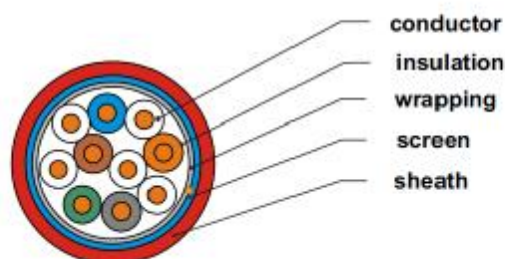
E90
PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
ZN-CB-25-2005



CABLES

HTKSHekw FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary. Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - mica tape and halogen free forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with a solid, tinned drain wire

sheath - flame resistant, halogen free polymer compound

HTKSHekw FE180/PH90/E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x 20 x 2 x	0,8
1 x 2 x 10 x 2 x	1,0
1 x 2 x 10 x 2 x	1,4
1 x 2 x 10 x 2 x	1,8
1 x 2 x 10 x 2 x	2,3
1 x 2 x 10 x 2 x	2,8

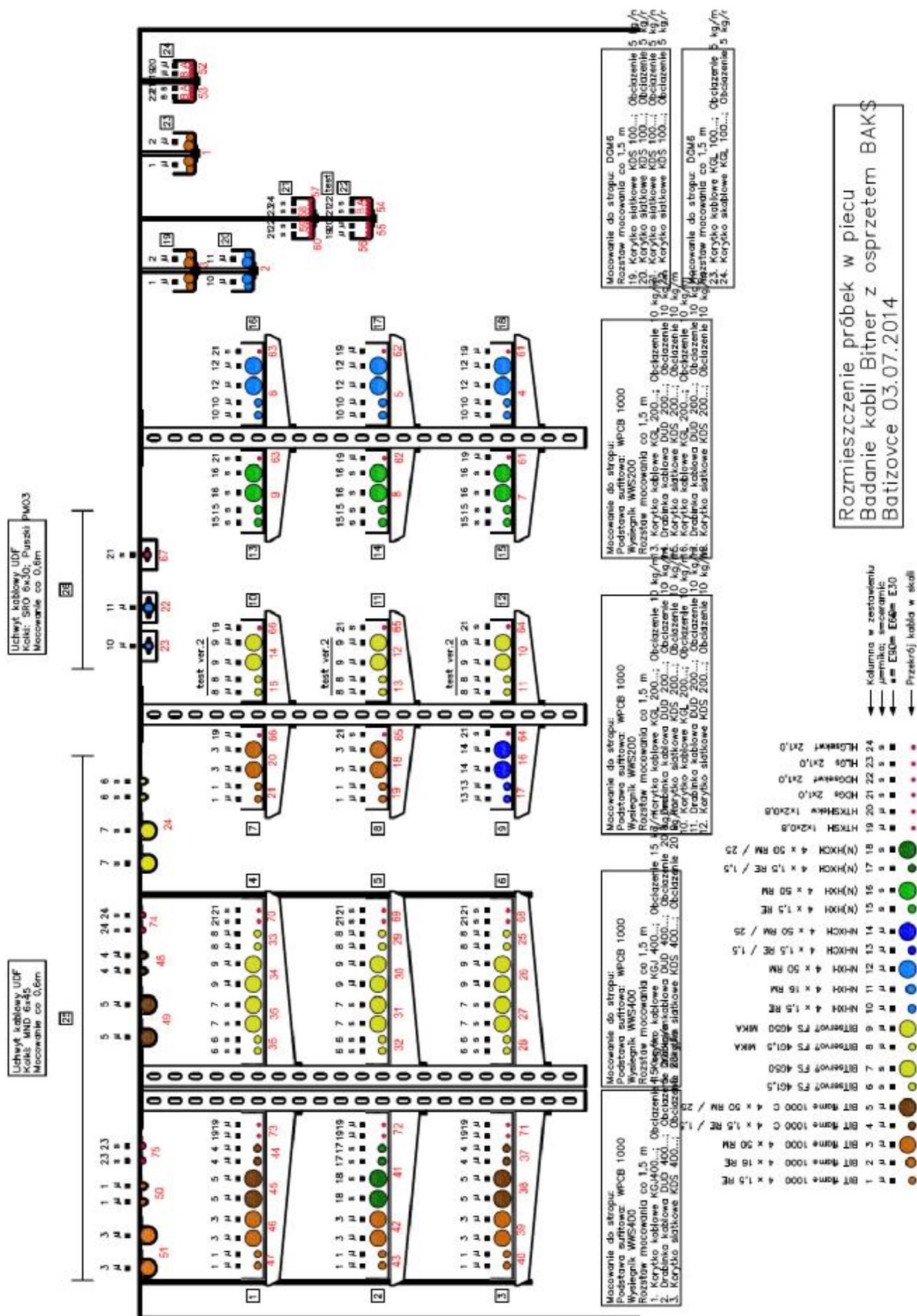
Operating voltage 225V
Voltage test 1500 V, 50 Hz
core/core

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -5°C up to +50°C
Minimum bending radius 10 x D single core
D = outer diameter

Cable combustibility E90
Fire resistance PN-EN 50200, PN-EN 50226:2006
Combustibility tests IEC 60332-3
Reference standards ZN-CB-25-2005

Rozmieszczenie próbek w piecu
Badanie kabli Bitner z osprzetem BAKS
Batizovce 03.07.2014





DRAWINGS

No.	No Fires	Cable type	Position	Description of construction
1	47	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	1	Cable trays KGJ/KGOJ400H60 1.5m / 15kg.m ⁻¹ ; steel sheet thickness 0,9 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
2		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
3	46	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
4		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
5	45	BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
6		BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
7	44	BIT flame 1000 C 4x1,5RE/1,5FE180/E90 0,6/1kV		
8		BIT flame 1000 C 4x1,5RE/1,5FE180/E90 0,6/1kV		
9	73	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
10		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
11	43	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	2	Cable ladders DUD/DUOD400H60 1.5m / 20kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
12		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
13	42	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
14		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
15	41	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
16		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
17		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
18		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
19	72	HTKSH 1x2x0,8 FE180/PH90/E90 225V	3	Cable mesh trays KDS/KKDSO400H60 1.5m / 20kg.m ⁻¹ ; steel wire Ø 4,5 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
20		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
21	40	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
22		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
23	39	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
24		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
25	38	BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
26		BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
27	37	BIT flame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
28		BIT flame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
29	71	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
30		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
31	36	BITservo® FS 4G1,5 FE180/E90 0,6/1kV	4	Cable trays KGJ/KGOJ400H60 1.5m / 15kg.m ⁻¹ ; steel sheet thickness 0,9 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
32		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
33	35	BITservo® FS 4G50 FE180/E90 0,6/1kV		
34		BITservo® FS 4G50 FE180/E90 0,6/1kV		
35	34	BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
36		BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
37	33	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
38		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
39	70	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
40		HDGs 2x1,0 FE180/PH/90/E90 300/500V		



DRAWINGS

No.	No Fires	Cable type	Position	Description of construction
41	32	BITservo® FS 4G1,5 FE180/E90 0,6/1kV	5	Cable ladders DUD/DUOD400H60 1.5m / 20kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
42		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
43	31	BITservo® FS 4G50 FE180/E90 0,6/1kV		
44		BITservo® FS 4G50 FE180/E90 0,6/1kV		
45	30	BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
46		BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
47	29	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
48		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
49	69	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
50		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
51	28	BITservo® FS 4G1,5 FE180/E90 0,6/1kV	6	Cable mesh trays KDS/KKDSO400H60 1.5m / 20kg.m ⁻¹ ; steel wire Ø 4,5 mm Construction: Consoles WPCB1000, brackets WWS/WWSO400, threaded rods PG M10, anchor bolts R-HPTII-ZF-10080/20 and expansion anchors R-DCA-10-40 of company (KOELNER RAWLPLUG)
52		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
53	27	BITservo® FS 4G50 FE180/E90 0,6/1kV		
54		BITservo® FS 4G50 FE180/E90 0,6/1kV		
55	26	BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
56		BITservo® FS 4G50 FE180/E90 0,6/1kV mica		
57	25	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
58		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica		
59	68	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
60		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
61	21	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	7	Cable trays KGL/KGOL200H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
62		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
63	20	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
64		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
65	66	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
66	19	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	8	Cable ladders DUD/DUOD200H60 1.5m / 10kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
67		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
68	18	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
69		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
70	65	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
71	17	NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	9	Cable mesh trays KDS/KDSO200H60 1.5m / 10kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
72		NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
73	16	NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
74		NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
75	64	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
76	15	BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2	10	Cable trays KGL/KGOL200H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
77		BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2		
78	14	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
79		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
80	66	HTKSH 1x2x0,8 FE180/PH90/E90 225V		



DRAWINGS

No.	No Fires	Cable type	Position	Description of construction
81	13	BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2	11	Cable ladders DUD/DUOD200H60 1.5m / 10kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
82		BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2		
83	12	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
84		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
85	65	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
86	11	BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2	12	Cable mesh trays KDS/KDSO200H60 1.5m / 10kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
87		BITservo® FS 4G50 FE180/E90 0,6/1kV mica v2		
88	10	BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
89		BITservo® FS 4G1,5 FE180/E90 0,6/1kV mica v2		
90	64	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
91	9	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	13	Cable trays KGL/KGOL200H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
92		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
93		(N)HXH 4x50RM FE180/E90 0,6/1kV		
94		(N)HXH 4x50RM FE180/E90 0,6/1kV		
95	63	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
96	8	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	14	Cable ladders DUD/DUOD200H60 1.5m / 10kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
97		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
98		(N)HXH 4x50RM FE180/E90 0,6/1kV		
99		(N)HXH 4x50RM FE180/E90 0,6/1kV		
100	62	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
101	7	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	15	Cable mesh trays KDS/KDSO200H60 1.5m / 10kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
102		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
103		(N)HXH 4x50RM FE180/E90 0,6/1kV		
104		(N)HXH 4x50RM FE180/E90 0,6/1kV		
105	61	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
106	6	NHXH 4x1,5RE FE180/E90 0,6/1kV	16	Cable trays KGL/KGOL200H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
107		NHXH 4x1,5RE FE180/E90 0,6/1kV		
108		NHXH 4x50RM FE180/E90 0,6/1kV		
109		NHXH 4x50RM FE180/E90 0,6/1kV		
110	63	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
111	5	NHXH 4x1,5RE FE180/E90 0,6/1kV	17	Cable ladders DUD/DUOD200H60 1.5m / 10kg.m ⁻¹ ; steel sheet thickness 1,2 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
112		NHXH 4x1,5RE FE180/E90 0,6/1kV		
113		NHXH 4x50RM FE180/E90 0,6/1kV		
114		NHXH 4x50RM FE180/E90 0,6/1kV		
115	62	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
116	4	NHXH 4x1,5RE FE180/E90 0,6/1kV	18	Cable mesh trays KDS/KDSO200H60 1.5m / 10kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: Consoles WPCB1000, brackets WWS/WWSO200, anchor bolts R-HPTII-ZF-10080/20 of company (KOELNER RAWLPLUG)
117		NHXH 4x1,5RE FE180/E90 0,6/1kV		
118		NHXH 4x50RM FE180/E90 0,6/1kV		
119		NHXH 4x50RM FE180/E90 0,6/1kV		
120	61	HTKSH 1x2x0,8 FE180/PH90/E90 225V		



DRAWINGS

No.	No Fires	Cable type	Position	Description of construction
121	3	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	19	Cable mesh trays KDS/KDSO100H60 1.5m / 5kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: hanger ZSW, threaded rods PG M8, expansion anchors R-DCA-8-30 of company (KOELNER RAWLPLUG)
122		BIT flame 1000 4x16RE FE180/E90 0,6/1kV		
122		BIT flame 1000 4x16RE FE180/E90 0,6/1kV		
124		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
125	2	NHXX 4x1,5RE FE180/E90 0,6/1kV	20	Cable mesh trays KDS/KDSO100H60 1.5m / 5kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: hanger ZSW, threaded rods PG M8, expansion anchors R-DCA-8-30 of company (KOELNER RAWLPLUG)
126		NHXX 4x16RE FE180/E90 0,6/1kV		
127		NHXX 4x16RE FE180/E90 0,6/1kV		
128		NHXX 4x1,5RE FE180/E90 0,6/1kV		
129	60	HDGs 2x1,0 FE180/PH/90/E90 300/500V	21	Cable mesh trays KDS/KDSO100H60 1.5m / 5kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: hanger ZSW, threaded rods PG M8, expansion anchors R-DCA-8-30 of company (KOELNER RAWLPLUG)
130		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
131	59	HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V		
132		HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V		
133	58	HLGs 2x1,0 FE180/PH/90/E90 300/500V		
134		HLGs 2x1,0 FE180/PH/90/E90 300/500V		
135	57	HLGsekwf 2x1,0 FE180/PH/90/E90 300/500V		
136		HLGsekwf 2x1,0 FE180/PH/90/E90 300/500V		
137	56	HTKSH 1x2x0,8 FE180/PH90/E90 225V	22	Cable mesh trays KDS/KDSO100H60 1.5m / 5kg.m ⁻¹ ; steel wire Ø 4,0 mm Construction: hanger ZSW, threaded rods PG M8, expansion anchors R-DCA-8-30 of company (KOELNER RAWLPLUG)
138		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
139	55	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
140		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
141	54B	HDGs 2x1,0 FE180/PH/90/E90 300/500V test		
142		HDGs 2x1,0 FE180/PH/90/E90 300/500V test		
143	54A	HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V test		
144		HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V test		
145	1	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	23	Cable trays KGL/KGOL100H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: hanger ZSW, threaded rods PG M6, expansion anchors R-DCA-6-30 of company (KOELNER RAWLPLUG)
146		BIT flame 1000 4x16RE FE180/E90 0,6/1kV		
147		BIT flame 1000 4x16RE FE180/E90 0,6/1kV		
148		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
149	53B	HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V	24	Cable trays KGL/KGOL100H60 1.5 m /10kg.m ⁻¹ ; steel sheet thickness 0,7 mm Construction: hanger ZSW, threaded rods PG M6, expansion anchors R-DCA-6-30 of company (KOELNER RAWLPLUG)
150		HDGsekwf 2x1,0 FE180/PH/90/E90 300/500V		
151	53A	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
152		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
153	52B	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
154		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
155	52A	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
156		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		



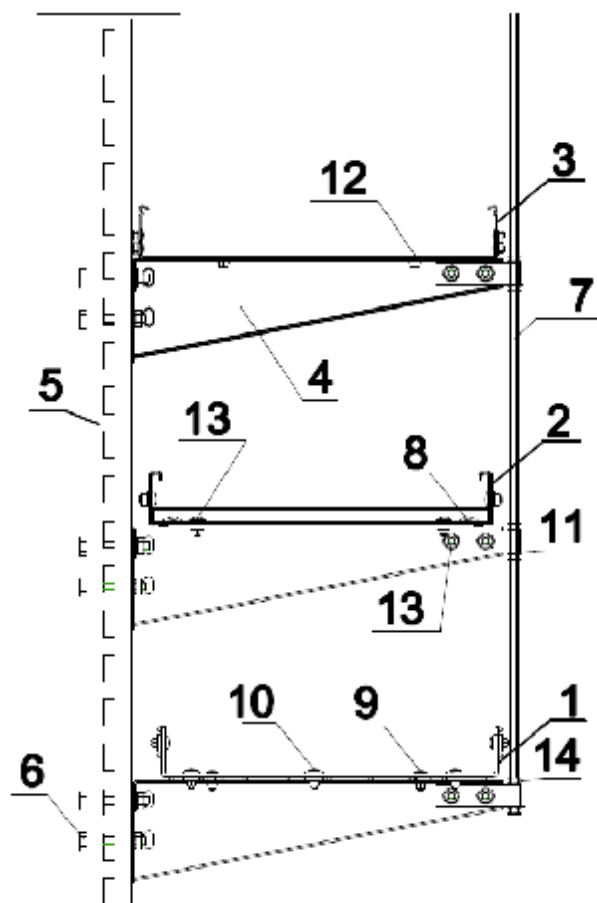
DRAWINGS

No.	No Fires	Cable type	Position	Description of construction
157	51	BIT flame 1000 4x50RM FE180/E90 0,6/1kV	25	Track is made of single cable clips (UDF) fixed to ceiling by anchors (MND Ø 6 x 45) mm in spacing of 600 mm.
158		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
159	50	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
160		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
161	75	HLGs 2x1,0 FE180/PH/90/E90 300/500V		
162		HLGs 2x1,0 FE180/PH/90/E90 300/500V		
163	49	BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
164		BIT flame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
165	48	BIT flame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
166		BIT flame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
167	74	HLGsekWF 2x1,0 FE180/PH/90/E90 300/500V		
168		HLGsekWF 2x1,0 FE180/PH/90/E90 300/500V		
169	24	BITservo® FS 4G50 FE180/E90 0,6/1kV		
170		BITservo® FS 4G50 FE180/E90 0,6/1kV		
171		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
172		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		

No.	Cable type	Diameter [mm]	Cable weight [kg/m]
1	NHXX 4x1,5RE FE180/E90 0,6/1kV	14,9	0,31
2	NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	15,7	0,35
3	NHXX 4x50RM FE180/E90 0,6/1kV	36,9	3,05
4	NHXCH 4x50RM/25 FE180/E90 0,6/1kV	39,8	3,30
5	(N)HXX 4x1,5RE FE180/E90 0,6/1kV	13,1	0,24
6	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	14,7	0,30
7	(N)HXX 4x50RM FE180/E90 0,6/1kV	34,9	2,85
8	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	36,9	3,10
9	HTKSH 1x2x0,8 FE180/PH90/E90 225V	6,1	0,04
10	HTKSHekWF 1x2x0,8 FE180/PH90/E90 225V	7,4	0,06
11	HDGs 2x1,0 FE180/PH90/E90 300/500V	6,8	0,06
12	HDGsekWF 2x1,0 FE180/PH90/E90 300/500V	7,1	0,07
13	HLGs 2x1,0 FE180/PH90/E90 300/500V	6,9	0,06
14	HLGsekWF 2x1,0 FE180/PH90/E90 300/500V	7,2	0,07
15	BITflame 1000 4x1,5RE FE180/E90 0,6/1kV	12,0	0,20
16	BITflame 1000 4x50RM FE180/E90 0,6/1kV	33,0	2,50
17	BITflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	13,0	0,25
18	BITflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV	35,0	2,80
19	BITservo® FS 4G1,5 FE180/E90 0,6/1kV	18,0	0,45
20	BITservo®FS 4G50 FE180/E90 0,6/1kV	39,0	3,10
21	BITservo® FS 4G1,5 FE180/E90 0,6/1kV MIKA	18,3	0,41
22	BITservo®FS 4G50 FE180/E90 0,6/1kV MIKA	37,0	2,80
23	BITservo® FS 4G1,5 FE180/E90 0,6/1kV MIKA v2	19,3	0,51
24	BITservo®FS 4G50 FE180/E90 0,6/1kV MIKA v2	40,1	3,1



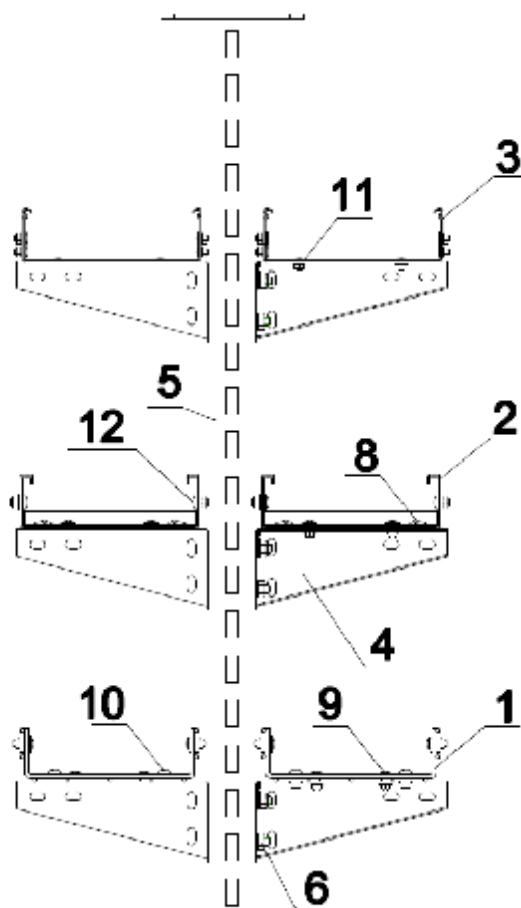
DRAWINGS



14	Nakrętka	NSM8	6
13	Śruba z łbem grzybkowym	SGNM8x14	8
12	Śruba z łbem grzybkowym	SGNM6x12	2
11	Podkładka	PP10	6
10	Uchwyt śrubowy	USSO	2
9	Zacisk śrubowy	ZSO	2
8	Zacisk mocujący	ZMO	2
7	Pręt gwintowany	PGM10/...	1
6	Śruba M10	SMM10x80	6
5	Wspornik sufitowy	WPCB1000	1
4	Wysięgnik	WWS/WWSO400	3
3	Koryto słatkowe	KDS/KDSO400h60	1
2	Drabinka	DUD/DUOD400H60	1
1	Koryto	KGJ/KGOJ400H80	1
L.p.	Nazwa	Symbol	Szt.



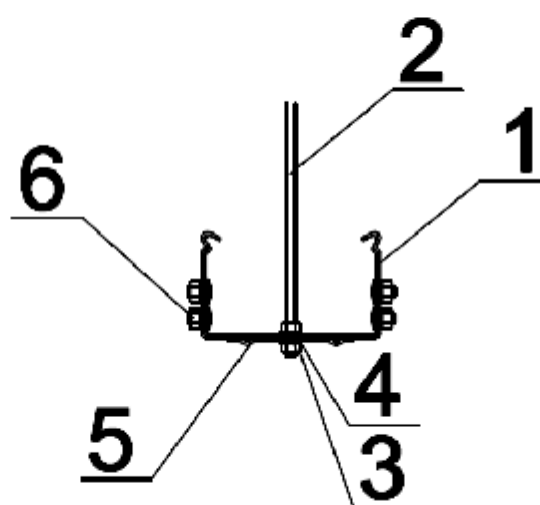
DRAWINGS



12	Śruba z łbem grzybkowym	SGNM8x14	4
11	Śruba z łbem grzybkowym	SGNM6x12	4
10	Uchwyt śrubowy	USSO	4
9	Zacisk śrubowy	ZSO	4
8	Zacisk mocujący	ZMO	4
7	Pręt gwintowany	PGM10/...	1
6	Śruba M10	SMM10x80	6
5	Wspornik sufitowy	WPCB1000	1
4	Wysięgnik	WWS/WWSO200	6
3	Koryto słatkowe	KDS/KDSO200H60	1
2	Drabinka	DUD/DUOD200H60	1
1	Koryto	KGJ/KGOJ200H60	1
L.p.	Nazwa	Symbol	Szt.



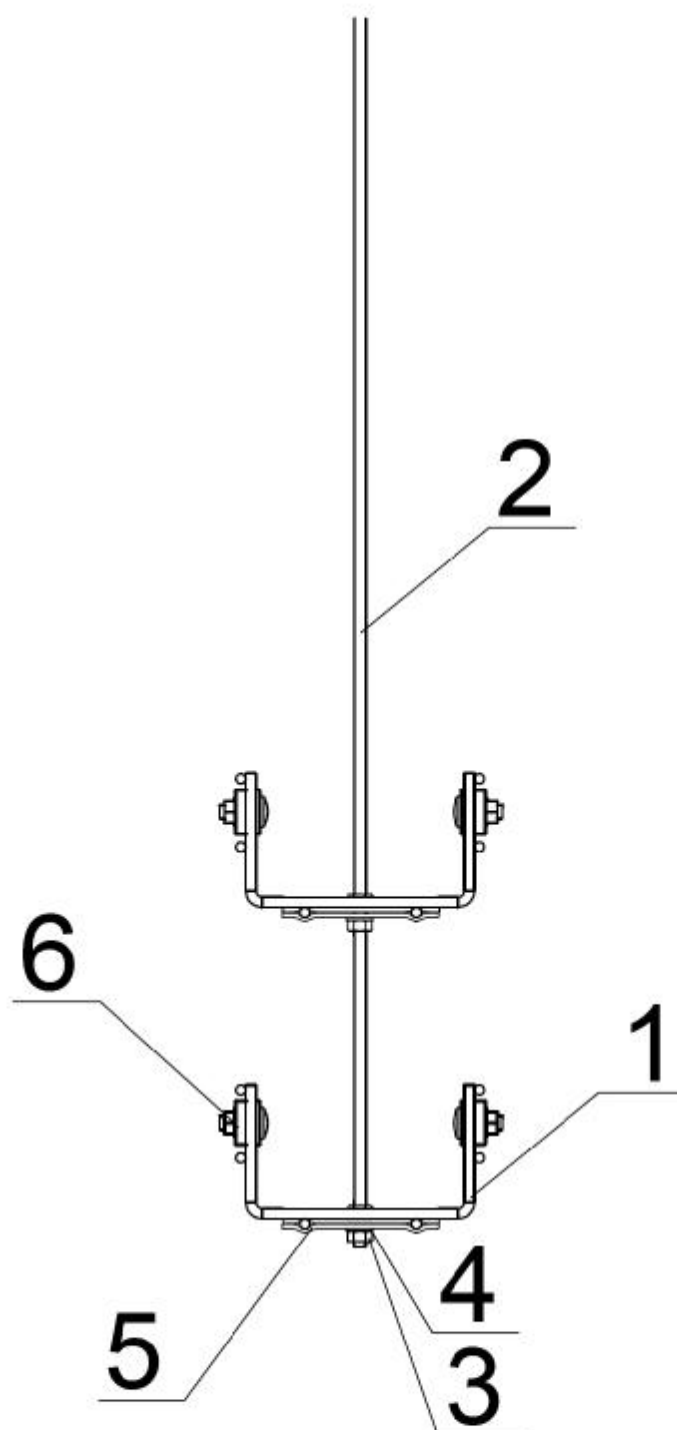
DRAWINGS



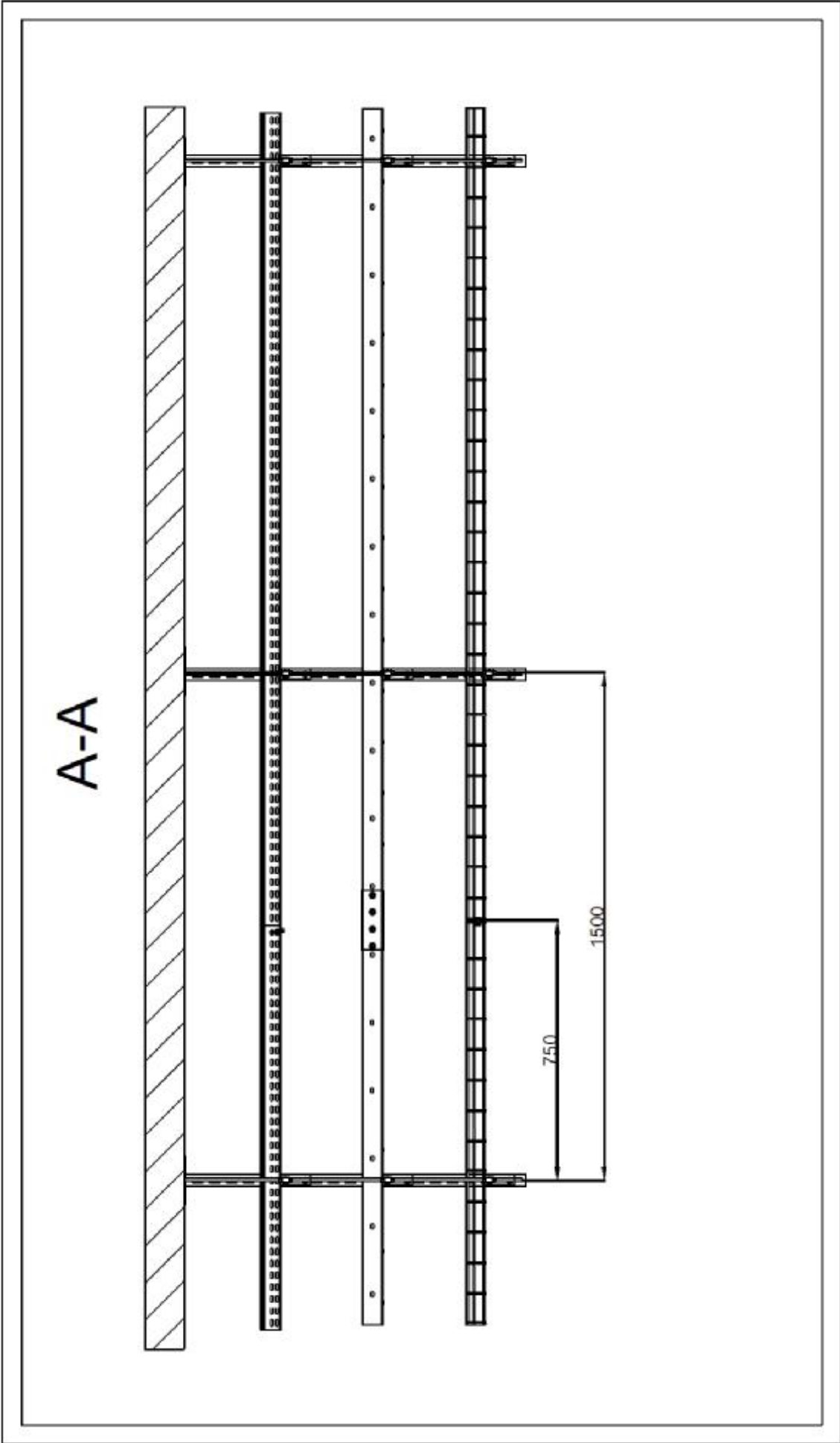
6	Śruba z łbem grzybkowym	SGNM6x12	4
5	Uchwyt śrubowy	USSPWO	1
4	Podkładka	PP6	2
3	Nakrętka	NSM6	2
2	Pręt gwintowany	PGM6/...	1
1	Koryto	KGL/KGOL100H60	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS

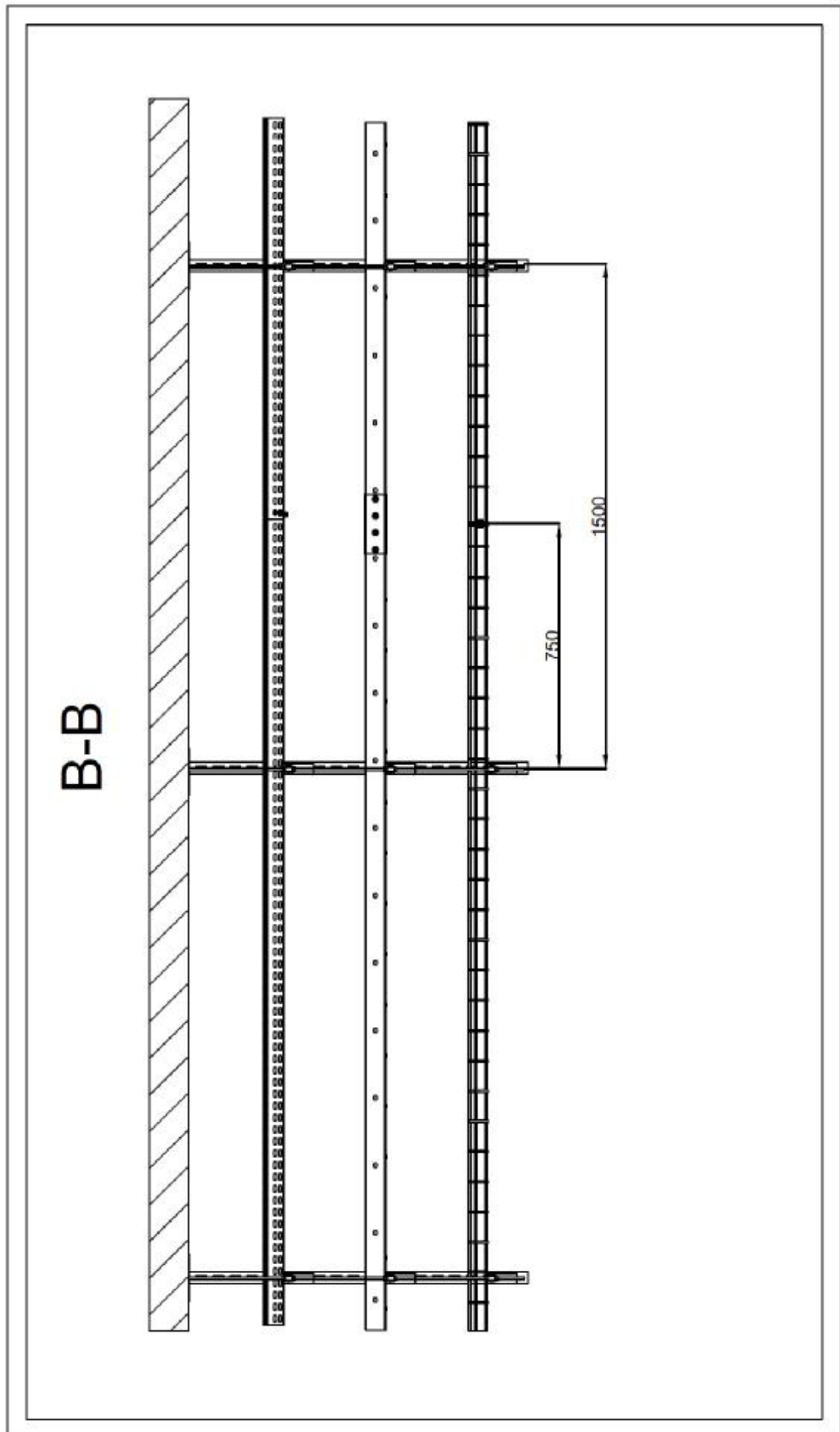


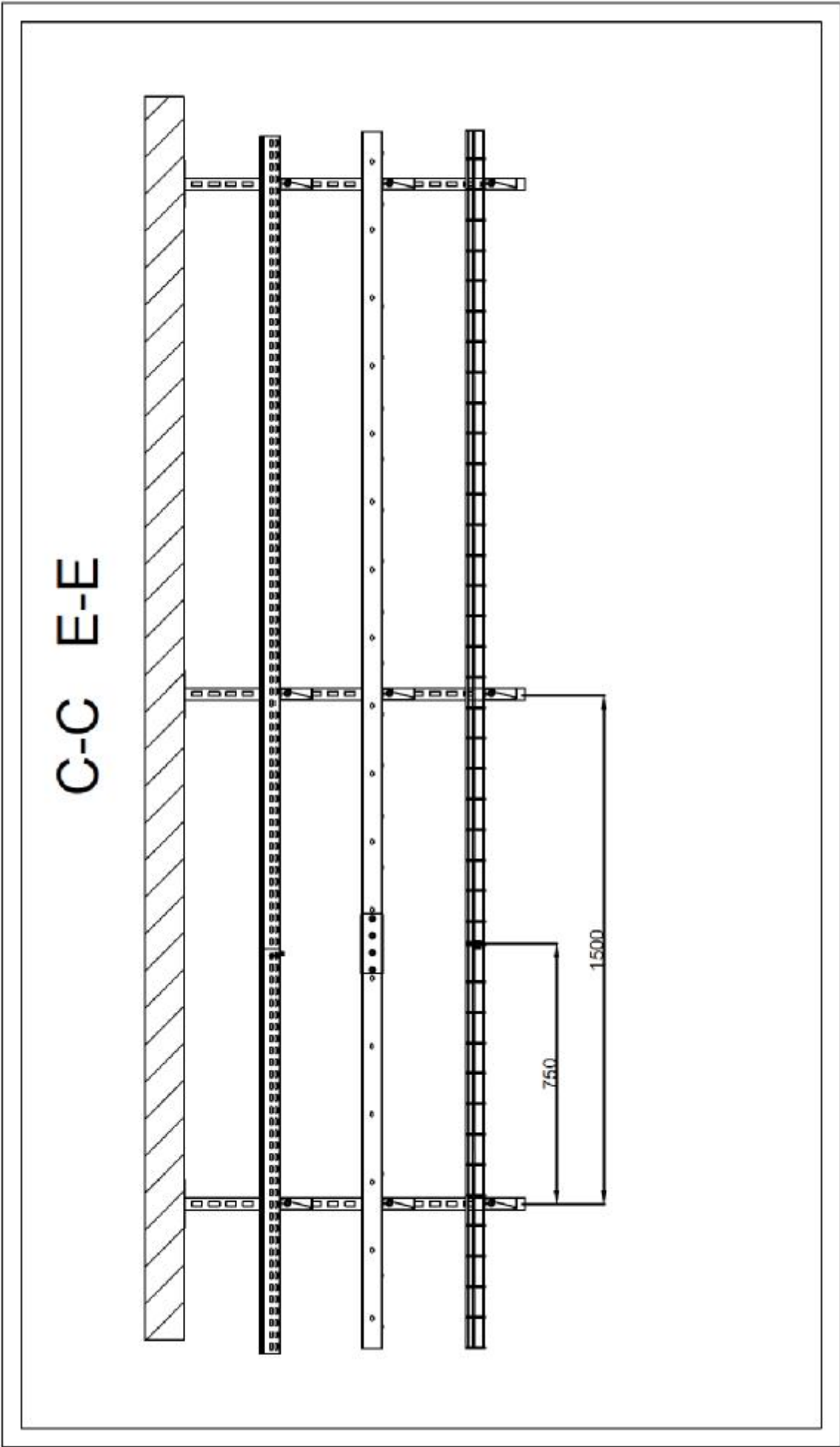
5	Uchwyt śrubowy	ZSW	4
4	Podkładka	PP8	4
3	Nakrętka	NSM8	4
2	Pręt gwintowany	PGM8/...	1
1	Koryto siatkowe	KDS/KDSO100H60	1
L.p.	Nazwa	Symbol	Szt.





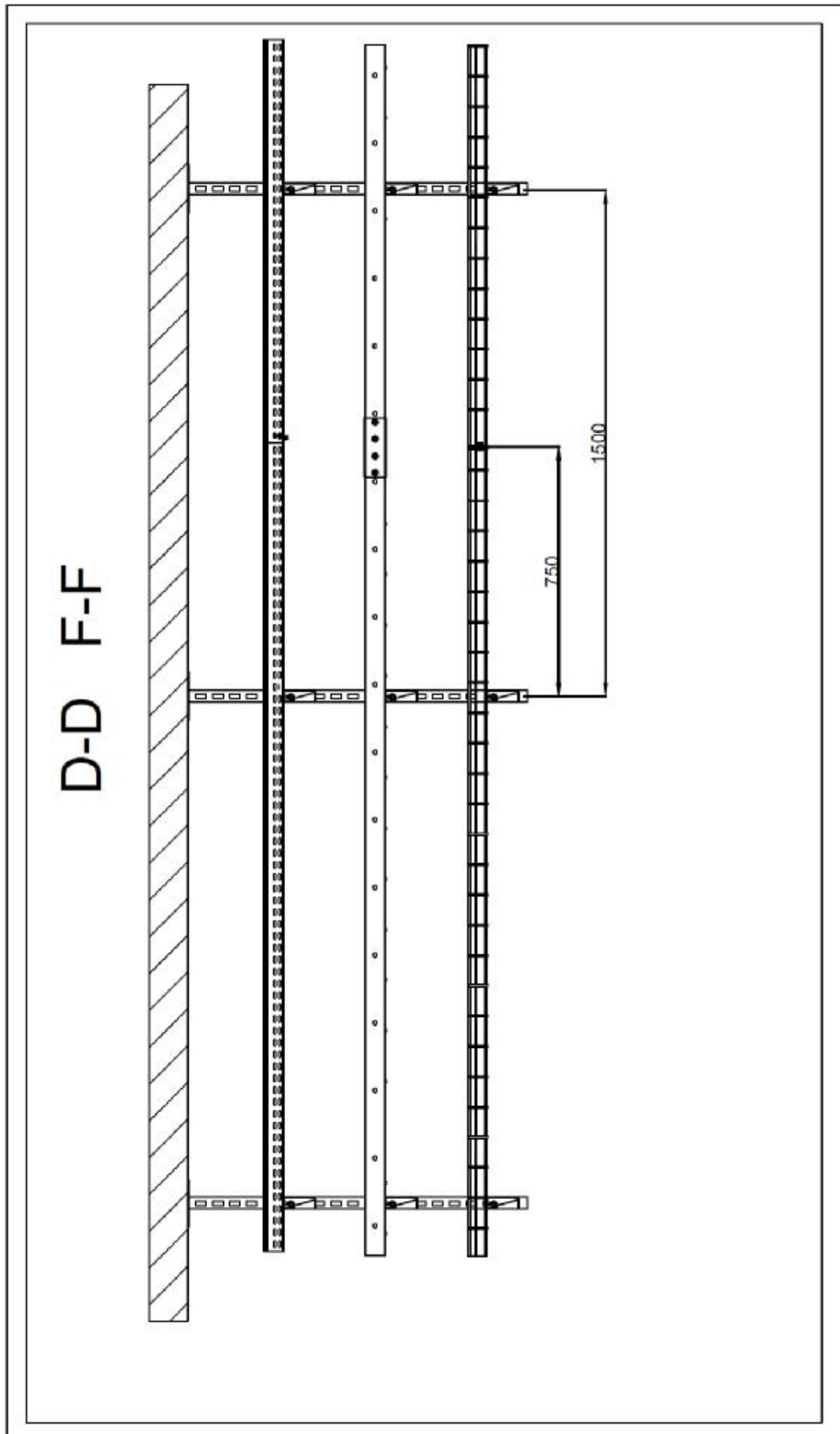
DRAWINGS

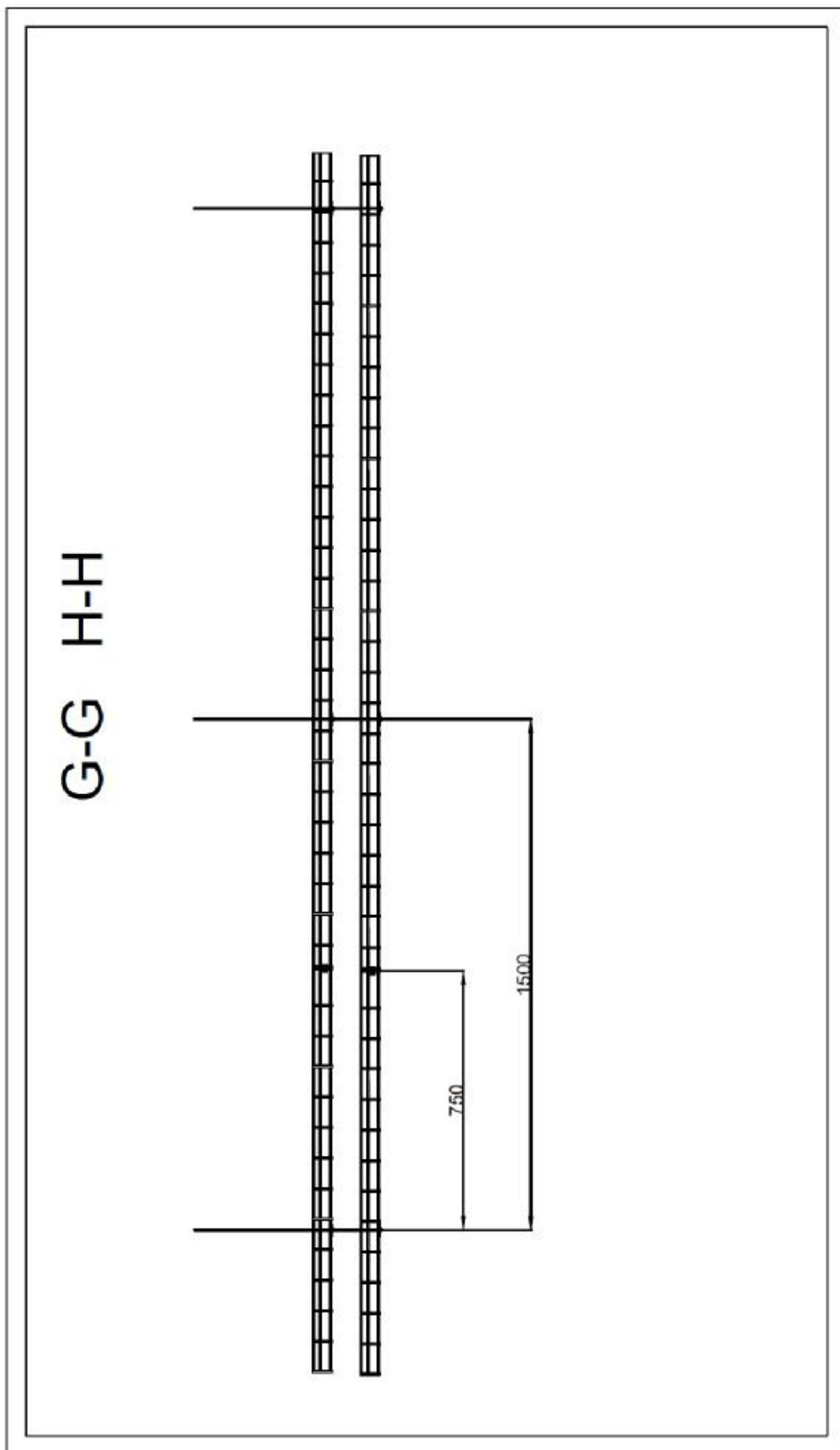






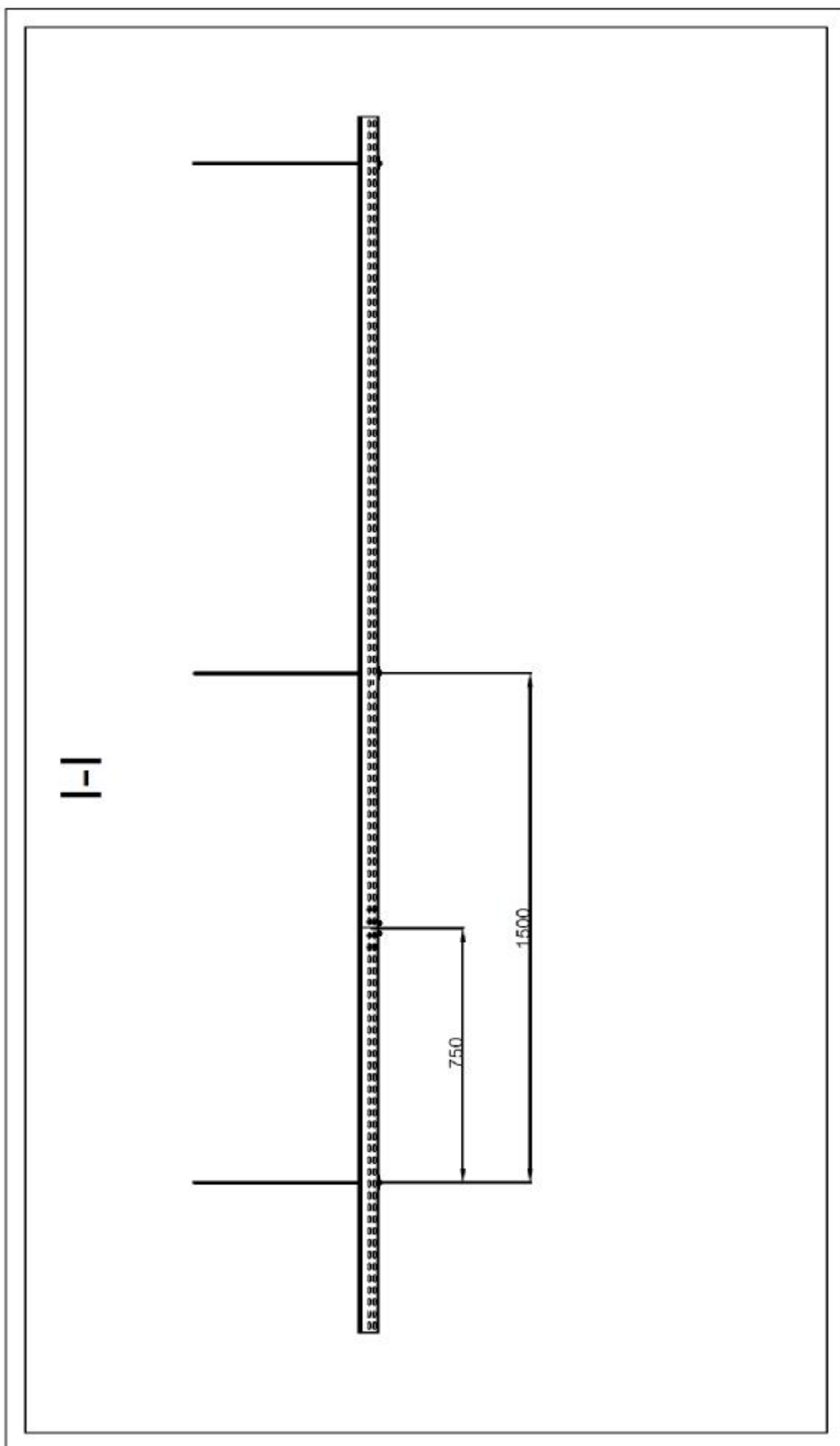
DRAWINGS

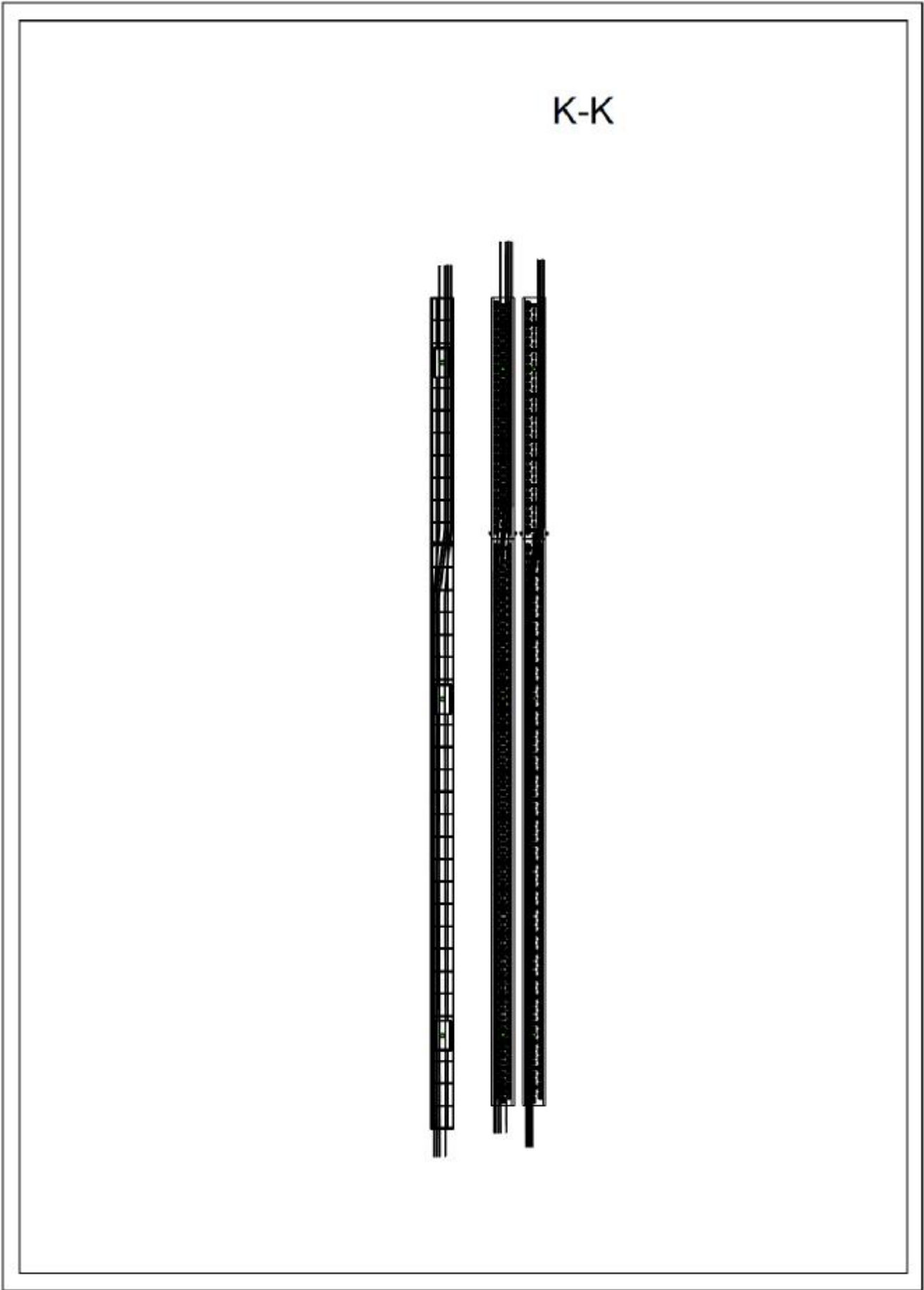






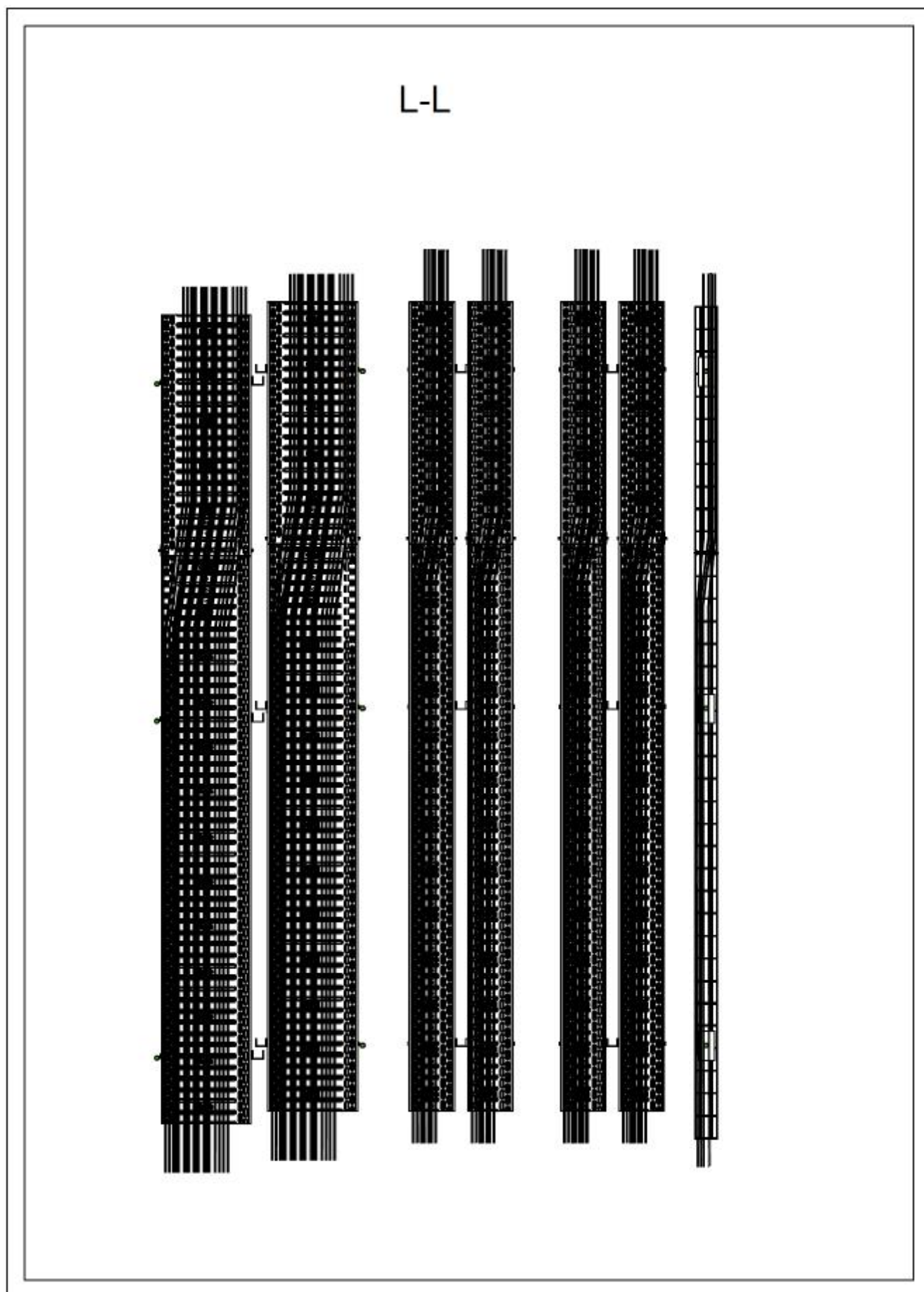
DRAWINGS







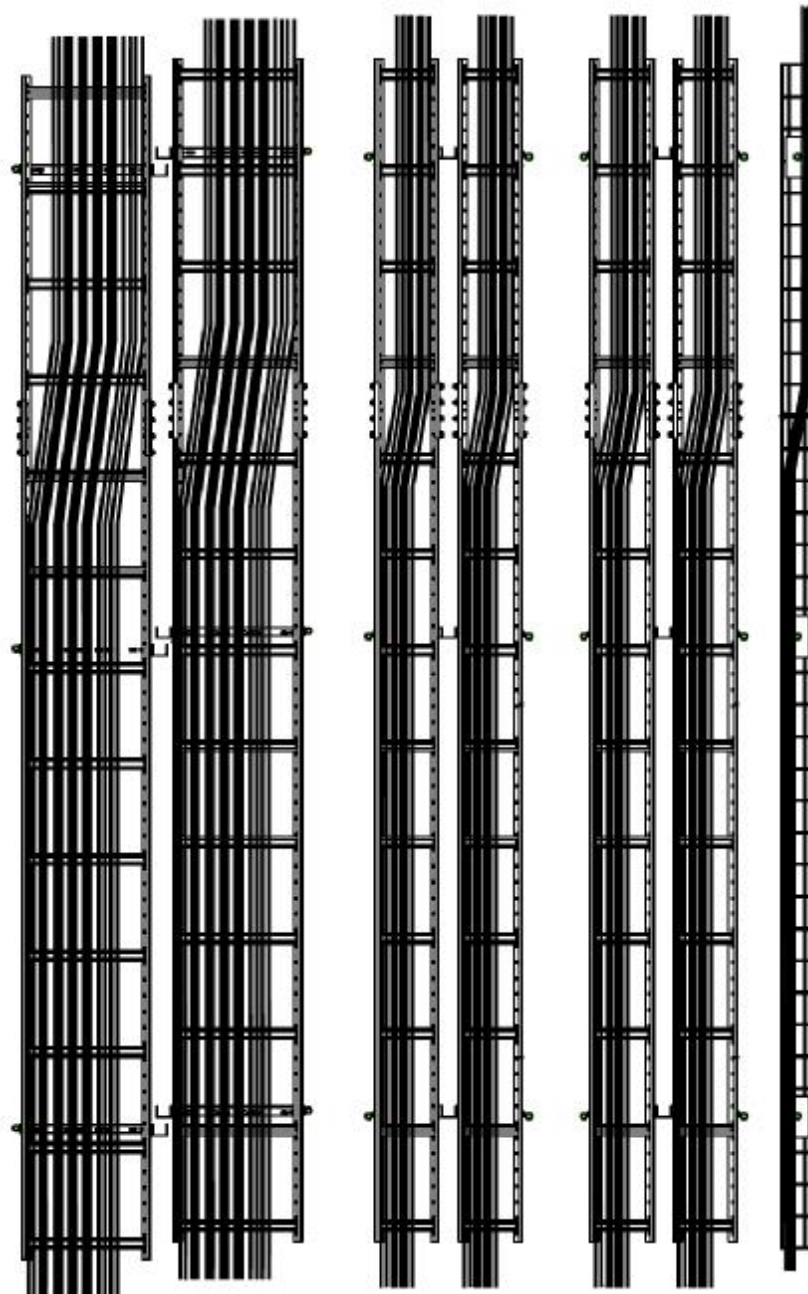
DRAWINGS





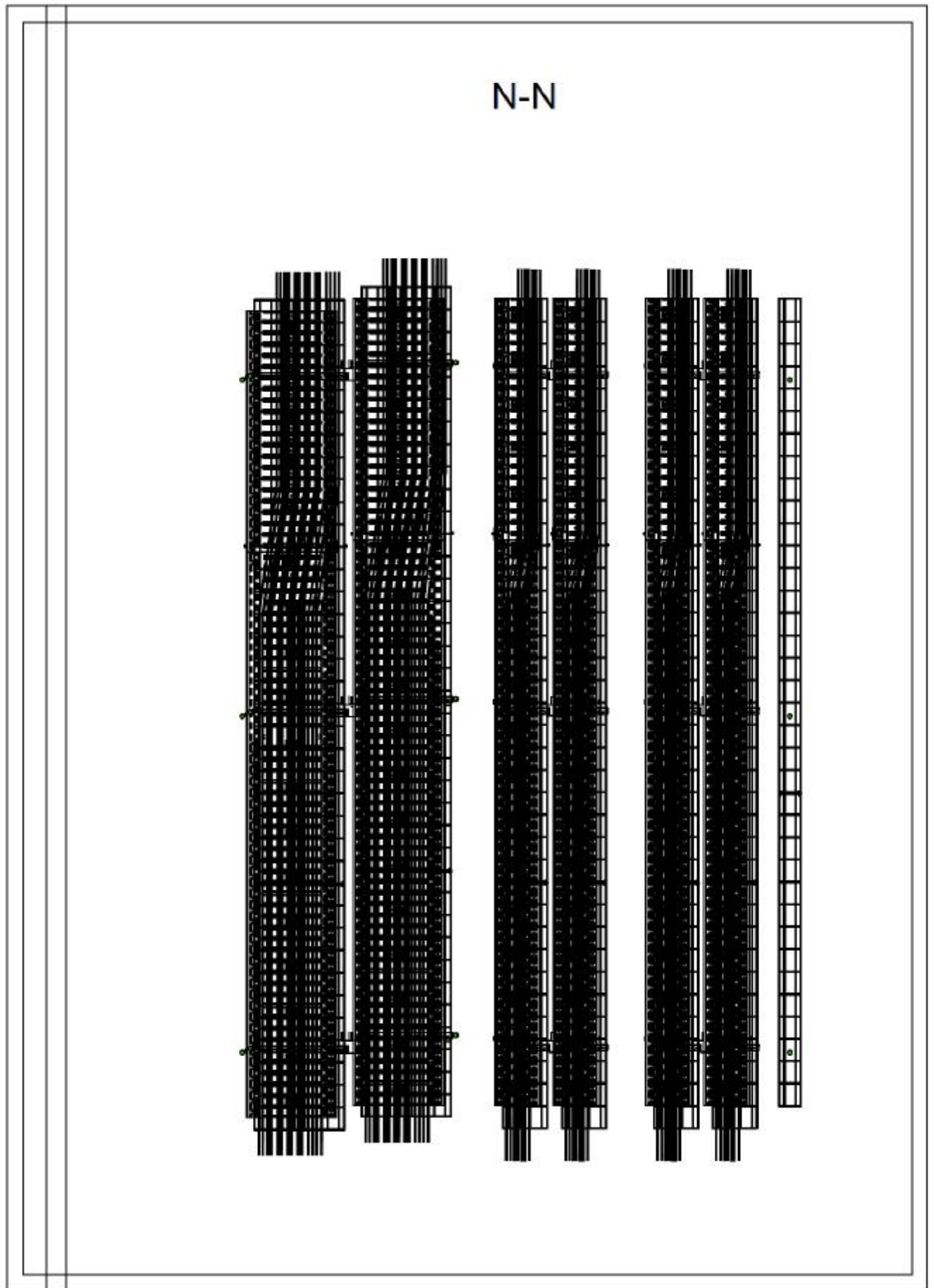
DRAWINGS

M-M



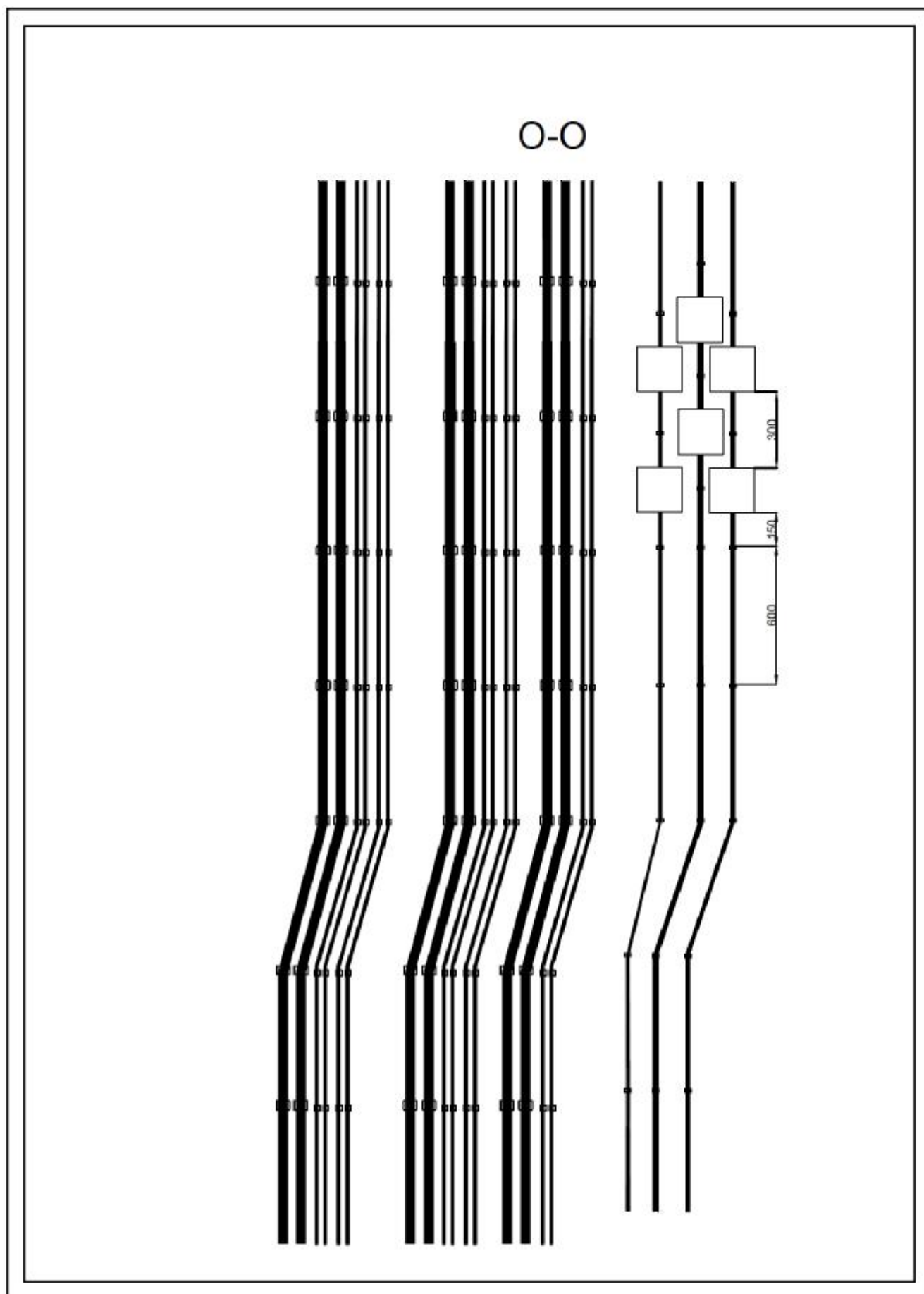


DRAWINGS

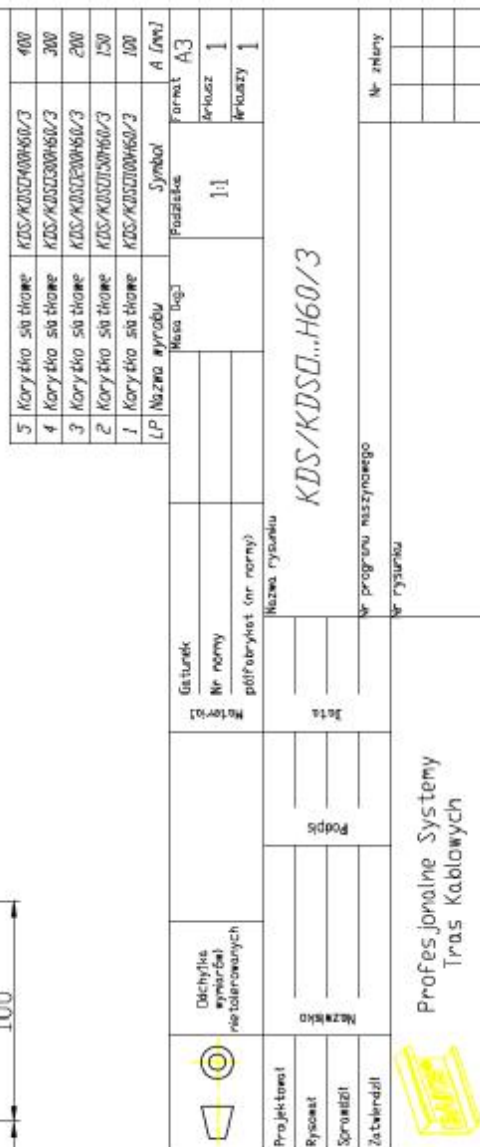




DRAWINGS

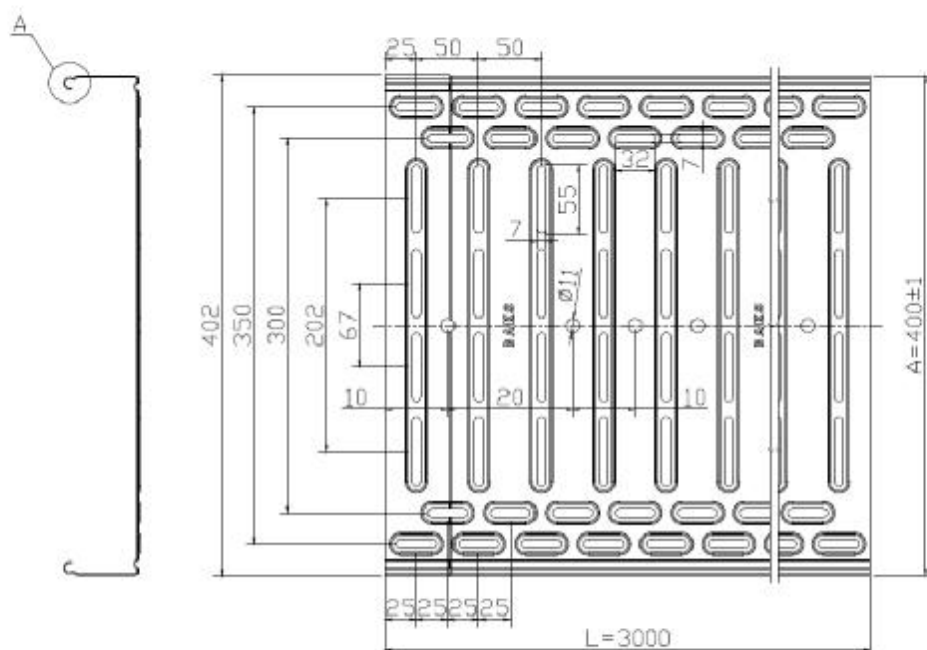
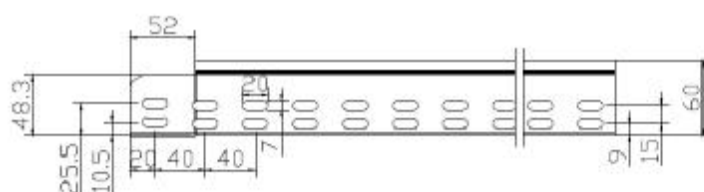
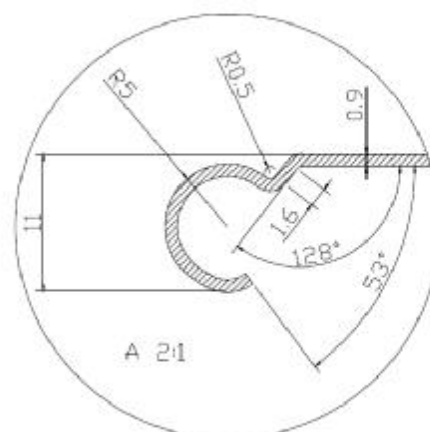


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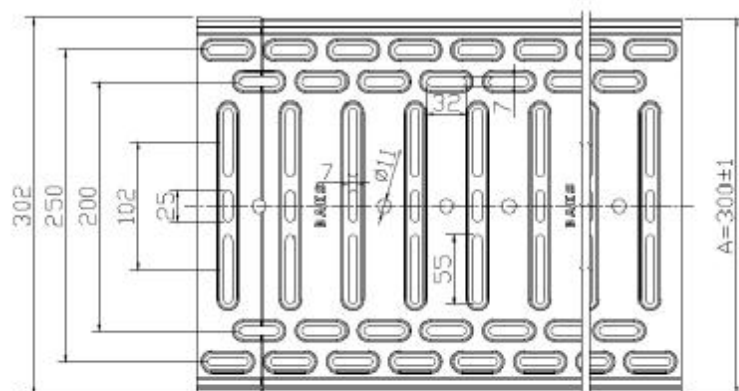
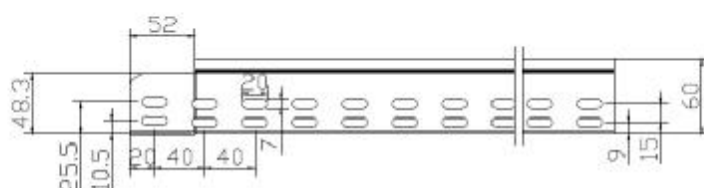
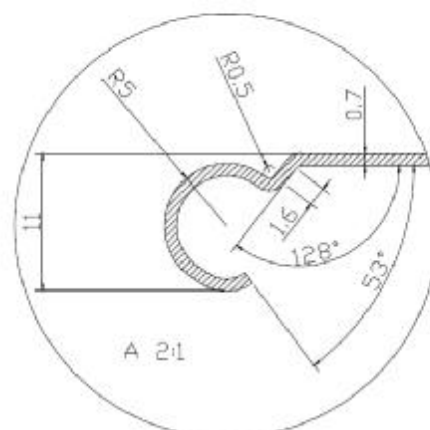
DRAWINGS

Typ	Szerokość A(mm)	Długość L(mm)
KGJ/KGDJ100H60/3	100	3000
KGJ/KGDJ200H60/3	200	3000
KGJ/KGDJ300H60/3	300	3000
KGJ/KGDJ400H60/3	400	3000



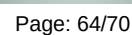
	Długość wytworów niezależnych		Materiał	Gatunek	Masa Bkg	Podziałka	Format
				Nr normy			
Projektant	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysownik				KGJ/KGDJ...H60/3			
Sprzedaż							
Zatwierdził				Nr programu maszynowego			
Profesjonalne Systemy Tras Kablowych							

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



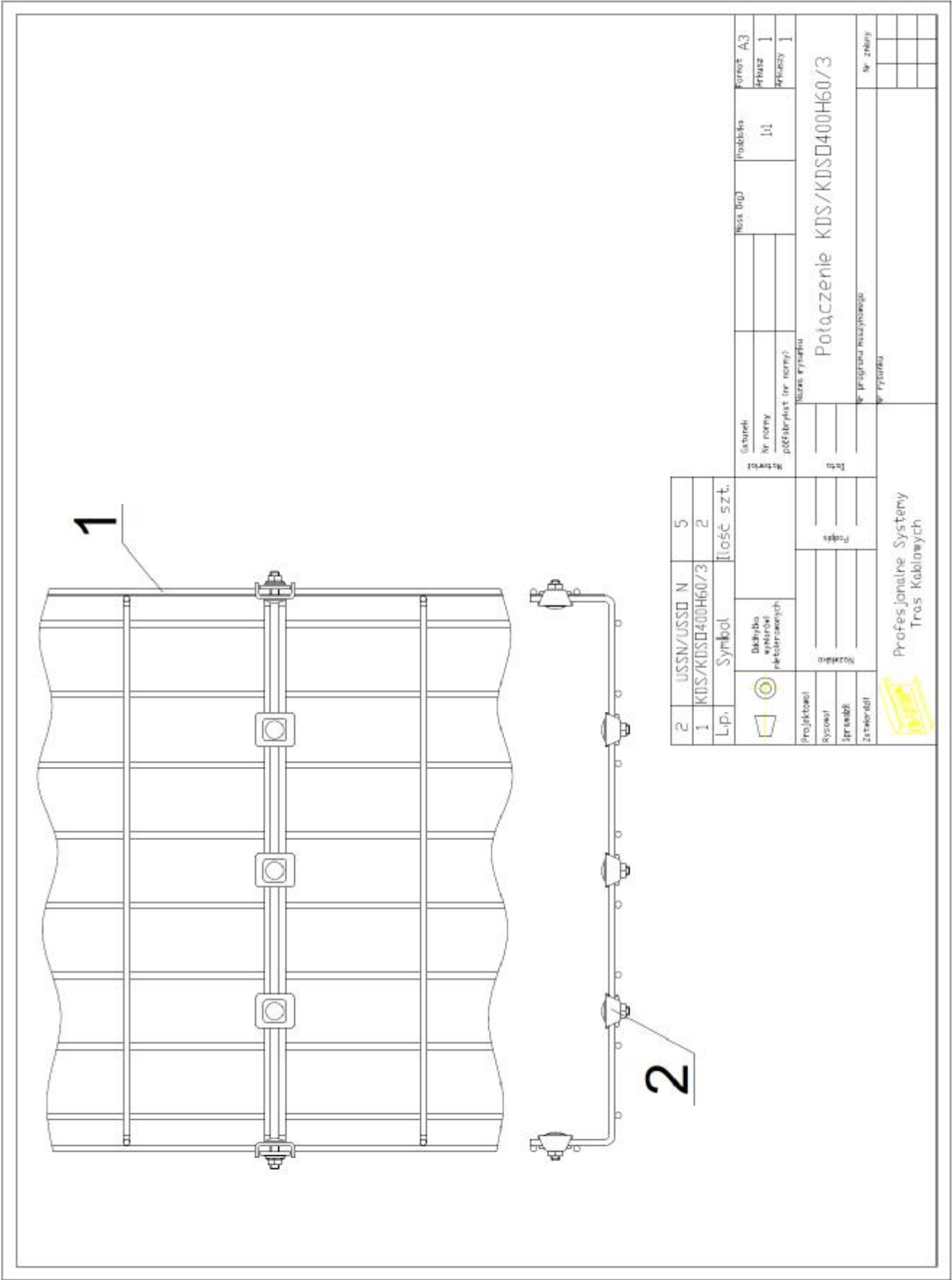
			Określenie wykładni nleciowej		Materiał Gotunek Nr normy półfabrykat (nr normy)	Masa Ugił 1:5	Podziałka 1:5	Format A4			
	Projektant		Data					Nazwa rysunku KGL/KGDL...H60/3		Nr programu kalkulacyjnego	
	Rysował		Data					Nr rysunku		Nr zmiany	
	Sprawdził		Data					Nr zmiany		Nr zmiany	
Zatwierdził		Data		Data		Data		Data			
Profesjonalne Systemy Tras Kablowych											

FIRES 064/S-26/11/2013-E



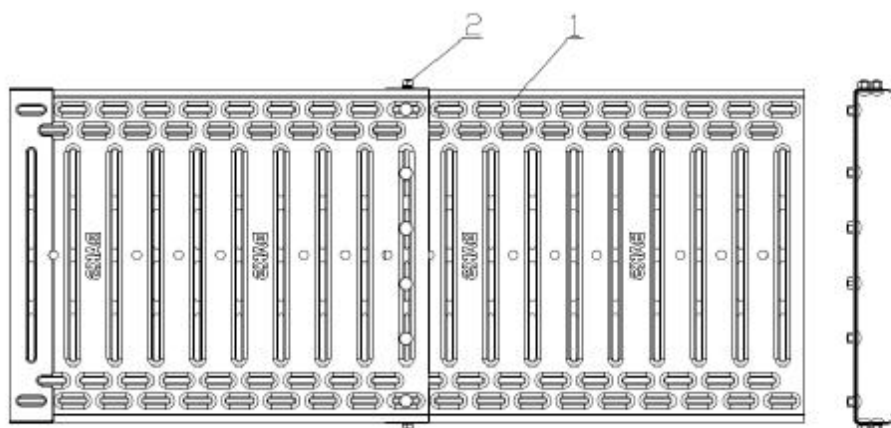
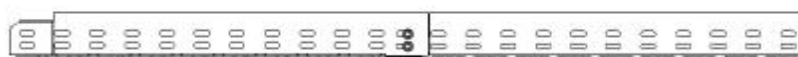
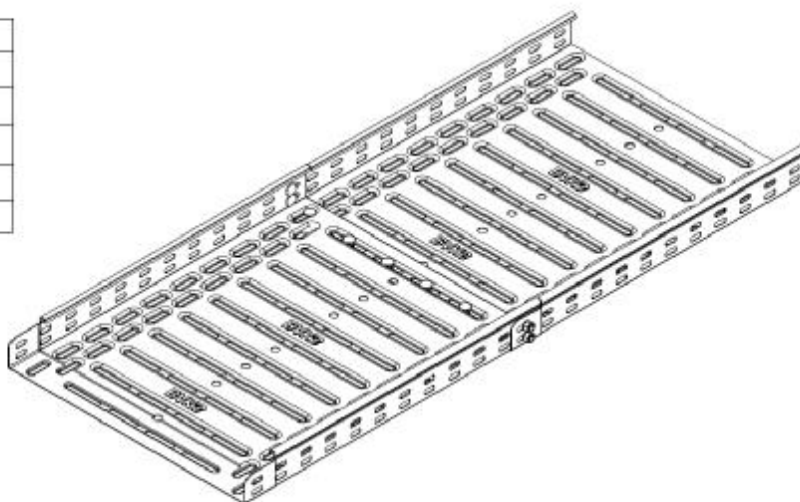


DRAWINGS



DRAWINGS

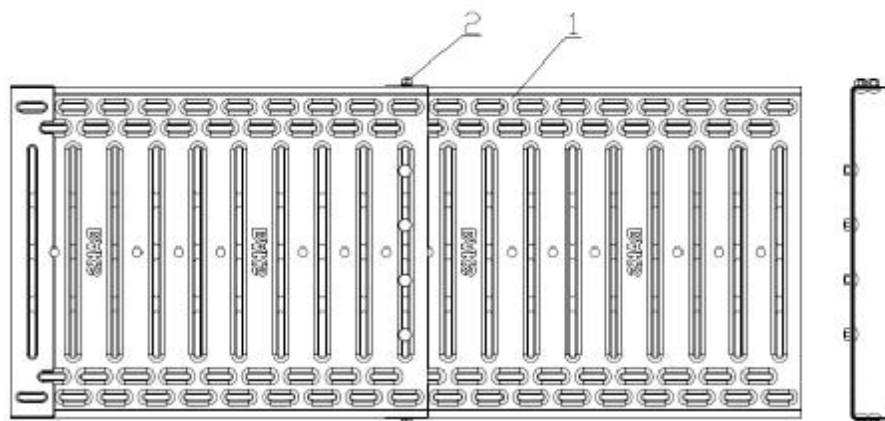
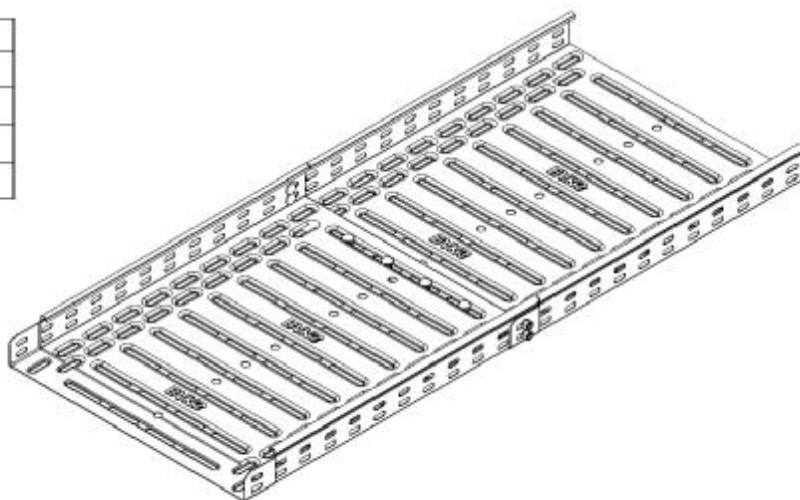
Poz.1		Poz.2
A	Typ	Rozc.
100	KGJ/KGDJ100H60/3	6
200	KGJ/KGDJ200H60/3	7
300	KGJ/KGDJ300H60/3	8
400	KGJ/KGDJ400H60/3	10



2	Śruba z łbem grzybkowym	SGN M5x12		10	
1	Korytka	KGJ/KGDJ400H60/3		2	
Lp.	Nazwa	Symbol	Materiał	Szt.	Nr katalogowy
	Długość wykonania niezależnych		Gatunek Nr normy poziomy Nr normy	Masa (kg)	Podział
Projektant					Forma A4
Wykonanie					Arkusze 1
Przebieg					Arkusze 1
Wykonanie					
Potaczenie KGJ/KGDJ400H60/3					
Profesjonalne Systemy Tras Kablowych					
Nr programu liczytowego					Nr zleceń
Nr rysunku					

DRAWINGS

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



2	Śruba z łbem grzybkowym	SGN M6x12		8		
1	Korytka	KGL/KGDL300H60/3		2		
Lp.	Nazwa	Symbol	Materiał	Szt.	Nr katalogowy	
	Odkrytyka wykłada niektóre		Główny		Kolor białe	
			Nr normy			
			podstawy (nr normy)			
Projektant		Nazwa rysunku	Pozycja	Data	Połączenie KGL/KGDL 300H60/3	
Wykonawca						
Sprawdzający						
Zatwierdzający						
				Nr programu nazajęzkiego	Nr zmiany	
				Nr rysunku		

System E-30, E-90 - puszki łączeniowo - rozgałęźne

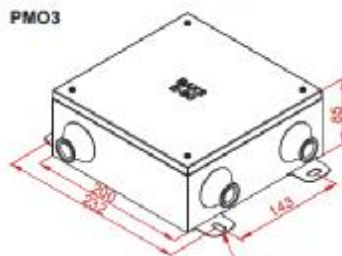


Uruchomienie produkcji w I kwartale 2014 r.



Puszka łącerniowo - rozgałęźna

PMO3



PMO3

SYMBOL	liczba kolek zaciskowych	liczba dławików	Przekrój kabli puszki łączniowa	Przekrój kabli puszki rozgałęźna	nr katalogowy	1
PMO3(6/4)	6	4	1 mm ² - 16 mm ²	1 mm ² - 16 mm ²	B03011	1

PMO3E

SYMBOL	liczba kolek zaciskowych	liczba dławików	Przekrój kabli puszki łączniowa	Przekrój kabli puszki rozgałęźna	nr katalogowy	1
PMO3(6/4)E	6	4	1 mm ² - 16 mm ²	1 mm ² - 16 mm ²	B03021	1

Przekroje żył możliwe
do połączenia
w jednym otworze

Tabela zestawienia elementów skrętnych do mocowania puszki PMO3 i PMO3E

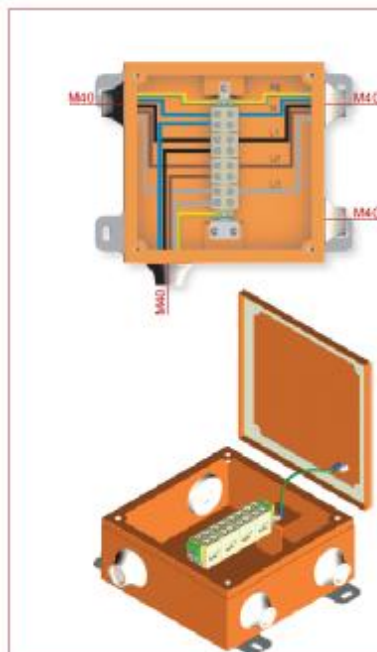
Elementy strefne	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA	ŚRÓBKA
Podłoże do mocowania	SR0M6x36	SB0M6x60	GS06x40	PSR0M6x45	MKR 6x32	KSK0M8	KKG5	SGKM6x12 SGKM8x14
Bełon	●	●	●	●	●	●		
Cegła SILKA					●	●		
Porotherm					●	●		
Karton gips							●	
Porobeton					●			
Strop kanałowy						●		
Konstr. tras kablowych								●

ZASTOSOWANIE

Puszka łączeniowa i rozgałęźna, UI=400 V,
z trwałym zachowaniem funkcji łączenia E30 / E60
/ E90 wg DIN 4102 część 12. Stopień ochrony
IP65, zakres uszczelnienia od Ø7 mm do Ø28 mm
Mocowanie poprzez zewnętrzne uchwyty
montażowe do betonu za pomocą kołków
stalowych. Do drabinek i korytek kablowych za
pomocą śruby SGK6x12. Montaż puszki na
korycie siatkowym za pomocą uchwyty puszki UP2
lub UPF... i komplety SGNM6x12

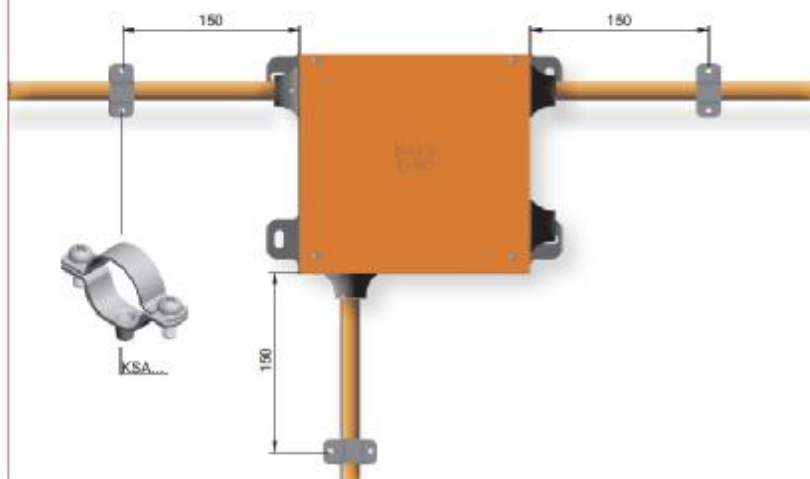
MATERIAL

PMO3 - stal cynkowana metodą zanurzeniową
PN-EN ISO 1461:2011, malowana proszkowo
RAL 2003
PMO3E - blacha kwasoodporna 1.4301
malowana proszkowo RAL 2003
- kostka zaciskowa wykonana jest ze specjalnej
ceramiki odpornej na wysokie temperatury,
- dławik wykonany jest z tworzywa bezhalogenowego
- mocowanie poprzez zewnętrzne uchwyty montażowe



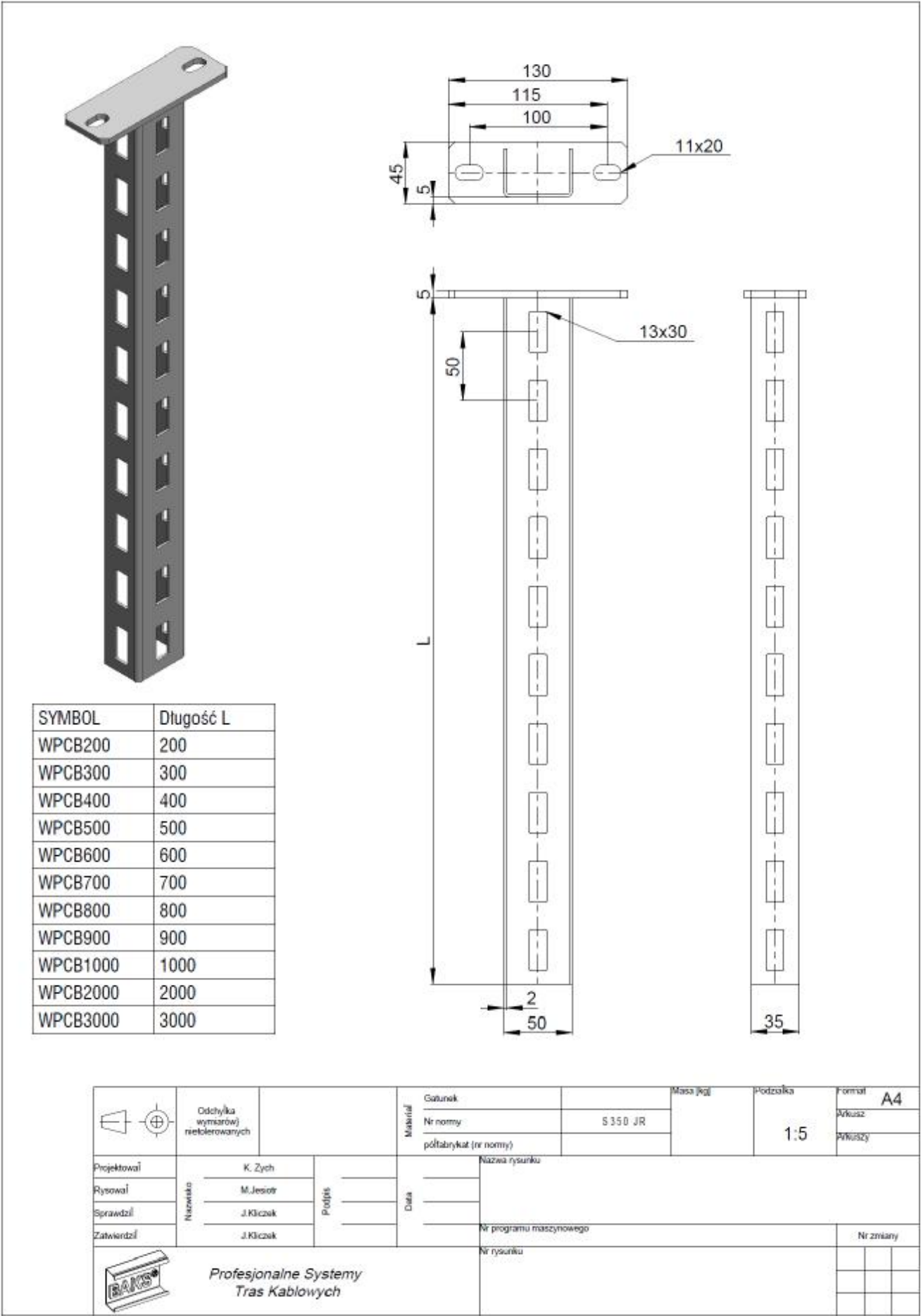
Instalacja puszki

- mocowanie kabli przed i za puszką max. 150 mm





DRAWINGS





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 EN 1363-1, and where appropriate STN 92 0205. 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:

Prepared by:

Ing. Štefan Rástocký
leader of the testing laboratory



Bc. Dávid Šubert
technician of the testing laboratory

8. NORMATIVE REFERENCES

EN 1363-1: 2012	Fire resistance tests. Part 1: General requirements
STN 92 0205:2014	Fire behaviour of construction products and building constructions. Circuit 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