TEST REPORT FIRES-FR-062-15-AUNE

Cable bearing system BAKS with cables business BITNER

Reg. No. 041/S-159

FIRES
The Experts on Fire Safety

TEST REPORT

FIRES-FR-062-15-AUNE

Tested property:	Functional resistance in fire
Test method:	STN 92 0205: 2014 (ZP-27/2008, DIN 4102-12: 1998-11) acc. to cl. 1 of this test report
Type of test:	Accredited
Date of issue:	26. 05. 2015
Name of the product:	Cable bearing system BAKS with cables business BITNER
Manufacturer:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland (producer of cable bearing system) Celina Bitner Zaklady Kablowe BITNER, ul. Józefa Friedleina 3/3, 30-009 Kraków, Poland (producer of cables)
Sponsor:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland
Test carried out by:	FIRES, s.r.o., Testing laboratory
Task No.:	PR-15-0109
Specimens received:	16. 03. 2015
Date of the test:	19. 03. 2015

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 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 92 025 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.

Sponsor's representatives witnessing the test:

Mr. Jacek Kliczek	BAKS Kazimierz Sielski
Mr. Marcin Tokaj	Zaklady Kablowe 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	Horizontal test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 020	Driver Tecomat - Reliance (SW)	-
F 71 041, F 71 042	Transducer of differential pressure (–50 to + 150) Pa	measurement of pressure inside the test furnace
F 54 064	Digital calliper (0 to 160) mm	-
F 54 056	Racking meter	-
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	measurement of climatic conditions

Identification number	Measuring equipment	Note
F 10 521 - F 10 528	Plate thermometers	measurement of temperature inside the test furnace according to EN 1363-1
F 10 701	Sheathed thermocouple type K Ø 3 mm	measurement of ambient temperature
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 Celina Bitner Zaklady Kablowe BITNER under supervision of laboratory technician.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing system of company BAKS Kazimierz Sielski – cable trays, mesh trays, ladders, cable clips and hangers with accessories (consoles, brackets, supports, hangers, etc.) and power and communication halogen free cables of company Celina Bitner Zaklady Kablowe BITNER.

Cables
Used cables by test:

Power cables:

BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	(6x)
BiTflame 1000 4x50RM FE180/E90 0,6/1kV	(6x)
BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	(8x)
BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV	(8x)
(N)HXH 4x1,5RE FE180/E90 0,6/1kV	(16x)
(N)HXH 4x50RM FE180/E90 0,6/1kV	(16x)
(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	(10x)
(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	(10x)

Communication cables:

HTKSH 1x2x0,8 FE180/PH90/E90 225V	(20x)
HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	(12x)
HDGs 2x1,0 FE180/PH90/E90 300/500V	(22x)
HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	(10x)
HLGs 2x1,0 FE180/PH90/E90 300/500V	(12x)

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 and 12
Tracks are made of four consoles (WPCB1000) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm.

Cable ladders (DUP600H60, height 60 mm, width 600 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed vertically to consoles by brackets (UTM/UTMO) and nut bolts (SGK M8x14) and loaded with 20kg.m^{-1}. Cables are fixed to ladders by cable clamps (UK1/UKO1).

Suspension tracks No. 2, 3 and 5, 6
Tracks are made of four consoles (WPCB1000) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Tracks No. 2 and 5:
Cable trays (KGL/KGOL300H60, height 60 mm, width 300 mm, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12, 7 pcs). Trays are fixed to brackets by screws (SGK M6x12, 2 pcs) and loaded with 10kg.m^{-1}. Cables are fixed to cable trays by plastic stripes only.

Tracks No. 3 and 6:
Cable ladders (DUP/DUOP300H60, height 60 mm, width 300 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO, 2 pcs) and nut bolts (SGK M8x14, 2 pcs) and loaded with 10kg.m^{-1}. Cables are fixed to cable trays by plastic stripes only.

Suspension track No. 4
Track is made of four consoles (WPDH1200) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWCH600) are fixed to consoles by 2 pcs of integrated screws.

Cable ladders (DUP600H60, height 60 mm, width 600 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed to brackets by nut bolts (SGK M8x14) and loaded with 20kg.m^{-1}. Cables are fixed to cable ladders by plastic stripes only.

Suspension track No. 7
Track is made of four consoles (WPCB1200) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable trays (KGJ/KGOJ400H60, height 60 mm, width 400 mm, steel sheet thickness 0,9 mm) fixed together by screws (SGK M6x12, 7 pcs). Trays are fixed to supports by screws (SGK M6x12, 2 pcs) and loaded with 10kg.m^{-1}. Cables are fixed to cable trays by plastic stripes only.

Floor tracks No. 8 and 9
Tracks are made of four consoles (WPDH1000) fixed alternately to concrete lintels by anchor bolts M10 in spacing of 1000 mm. Brackets (WWCH600) are fixed to consoles by 2 pcs of integrated screws.

Cable ladders (DUP600H60, height 60 mm, width 600 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed to brackets by nut bolts (SGK M8x14) and loaded with 40kg.m^{-1}. Cables are fixed to cable ladders by plastic stripes only.

Suspension tracks No. 10 and 11
Tracks are made of supports (CWP/CWOP40H40) fixed together by junction (LC40H40) and screws (SGK M10x20, 8 pcs). Supports are fixed to ceiling by threaded rods (PG M8) in spacing of 1500 mm and loaded with 4kg.m^{-1}.

Ceiling track No. 13
Track is made of steel pipes RU (Ø 15 mm, Ø 63,5 mm) fixed to ceiling by hangers (OBS) in spacing of 1500 mm. Cables are embedded inside the pipes. Steel pipes are at mid-length separated without offset.

Ceiling track No. 14
Track is made of PVC ledges (KI) fixed to ceiling. Cables and ledges are fixed to ceiling by cable clips (UDF) and screws (MKR 6x32) in spacing of 600 mm.

Ceiling track No. 15
Track is made of plastic pipes RL (Ø 15 mm, Ø 63 mm) fixed to ceiling by hangers (KSA) in spacing of 600 mm. Cables are embedded inside the pipes. Pipes are without separation.

Ceiling track No. 16
Cable ladders (DUP600H60, height 60 mm, width 600 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed to ceiling conversely by threaded rods (PG M10) and hangers (UTM/UTMO) in spacing of 1500 mm. Hangers are fixed to ladders by nut bolt (SGK M8x14). Ladders are loaded with 20kg.m^{-1}. Cables are fixed to ladders by cable clamps (UK1/UKO1).

Ceiling track No. 17
Track is made of PVC ledges (KI) fixed to ceiling. Cables and ledges are fixed to ceiling by cable clamps (KSA) in spacing of 600 mm.

All bearing systems were from steel, galvanized according to the Sendzimir method PN-EN 10327:2005.
Cable penetration through the wall of test furnace was sealed by mineral wool.
Loading with steel chain and line loads was used as the equivalent load.

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 THE SPECIMENS FIXATION

The test specimens were fixed on the ceiling of the test furnace which was created from aerated concrete panels with dimensions (4000 x 600 x 240) mm – 7 pieces and to two concrete lintels. Ceiling panels were jointed by beam which provides balance deflection of the ceiling.

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 THE SPECIMENS

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

4.4 CLIMATIC CONDITIONING OF THE SPECIMENS

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

Ambient air temperature [°C]

mean	19,5
standard deviation	1,1

Relative air humidity [%]

mean	42,5
standard deviation	1,9

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 O_2) as well as in the testing room (ambient temperature) corresponded to EN 1363-1 during the test. Detailed information is part of this test report.

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

Relative air humidity [%]	Ambient air temperature [°C]
46,1	15,2

5.3 RESULTS OF THE TEST

Measured values of individual cables are stated in this test report.
During the test there was a gradual deflection of cable bearing system, but no failure or damage of tracks – even during cooling down of the tracks after termination of the test. Deflection of cable bearing system was not measured.

6. CLOSING

Evaluation of the test:

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
1	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	12	38 minutes
2	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		67 minutes
3	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		51 minutes
4	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		40 minutes
5	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	9	69 minutes
6	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
7	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		90 minutes no failure / interruption
8	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
9	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	8	33 minutes
10	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		89 minutes
11	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		65 minutes
12	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		54 minutes
13	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	16	77 minutes
14	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		42 minutes
15	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		47 minutes
16	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		37 minutes
17	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV	7	90 minutes no failure / interruption
18	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
19	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	6	4 minutes
20	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		56 minutes
21	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	5	90 minutes no failure / interruption
22	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		55 minutes

Specimen No.		Cables	Track No.	Time to first failure / interruption of conductor
23		2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	15	90 minutes no failure / interruption
24		2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
25		2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	4	80 minutes
26		2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
27		2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		76 minutes
28		2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
29		2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	3	90 minutes no failure / interruption
30		2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		80 minutes
31		2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	2	90 minutes no failure / interruption
32		2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		60 minutes
33		2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	14	53 minutes
34		2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		72 minutes
35		2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	13	90 minutes no failure / interruption
36		2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		78 minutes
37		2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	1	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 4x1,5RE FE180/E90 0,6/1kV		73 minutes
40		2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		68 minutes
52		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	12	59 minutes
53	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	B	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V		33 minutes
54	A	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	17	76 minutes
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		80 minutes
55	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	11	90 minutes no failure / interruption
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
56	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	10	90 minutes no failure / interruption
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
57	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	9	90 minutes no failure / interruption
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
58	A	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V	8	37 minutes
	B	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
59		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		85 minutes
60	A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	16	90 minutes no failure / interruption
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		58 minutes
61		2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V		52 minutes
62	A	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	7	44 minutes
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
63	A	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + **firebox PMO1**		90 minutes no failure / interruption
	B	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + **firebox PMO2**		90 minutes no failure / interruption
64	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	6	90 minutes no failure / interruption
	B	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V		66 minutes
65	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	5	90 minutes no failure / interruption
	B	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V		45 minutes
66		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	15	90 minutes no failure / interruption
67	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption

Specimen No.		Cables	Track No.	Time to first failure / interruption of conductor
68	A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	**4**	90 minutes no failure / interruption
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
69	A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	**3**	90 minutes no failure / interruption
	B	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
70	A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	**2**	90 minutes no failure / interruption
	B	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		84 minutes
71	A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	**1**	90 minutes no failure / interruption
	B	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
72		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	**14**	90 minutes no failure / interruption
73	A	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V	**13**	69 minutes
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		48 minutes

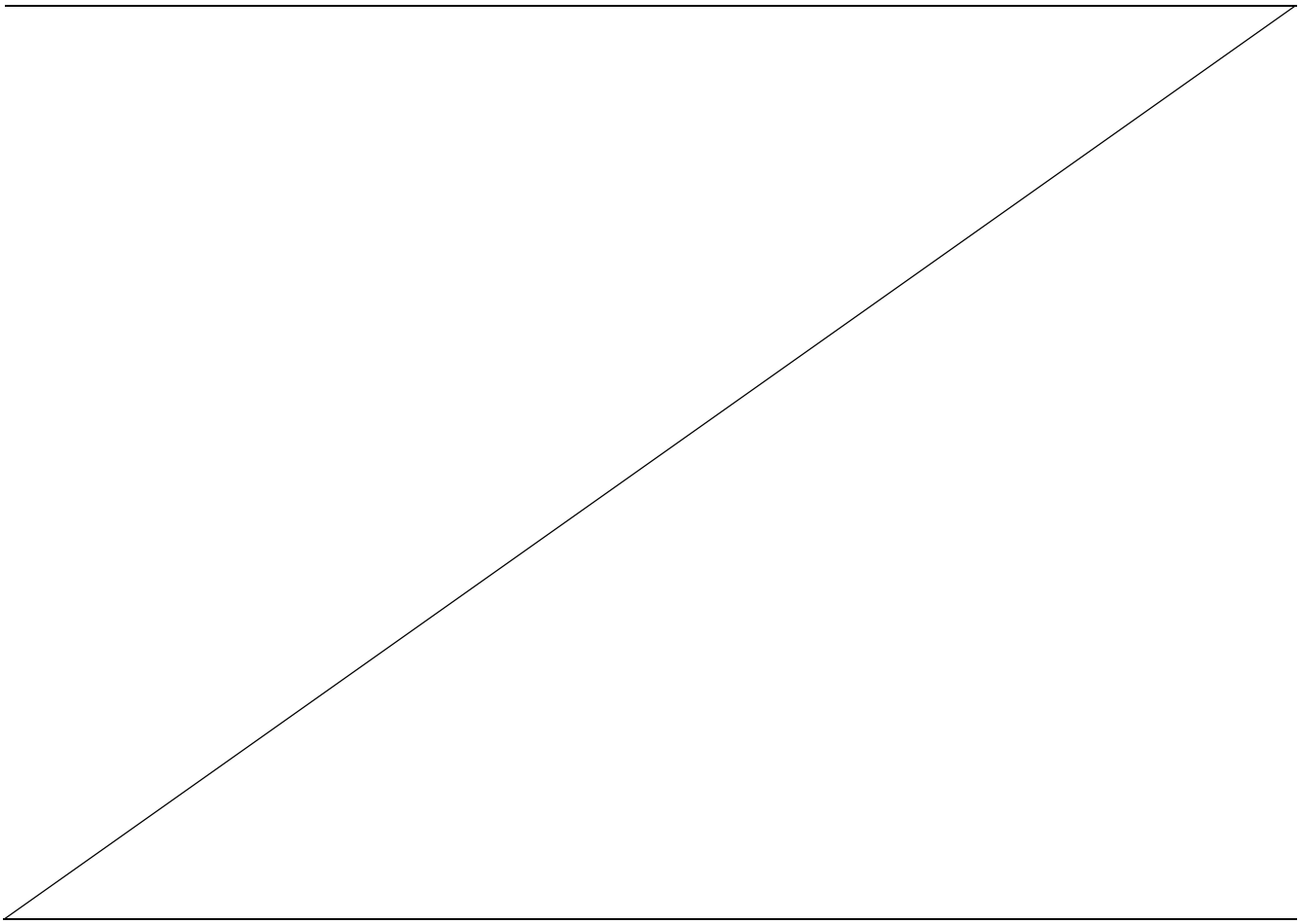
The fire test was discontinued in 94th minute at the request of test sponsor.

Specimens S1 – S40 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S73 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

Circuit breakers with rating 3 A were used.

7. DIRECT APPLICATION OF TEST RESULTS

Direct field of application is valid in accordance with STN 92 0205: 2014 (cl. 7), ZP-27/2008 (cl. 11) and DIN 4102-12: 1998-11 (clause 8). Validity of individual items of field of direct application shall be determined in classification process.

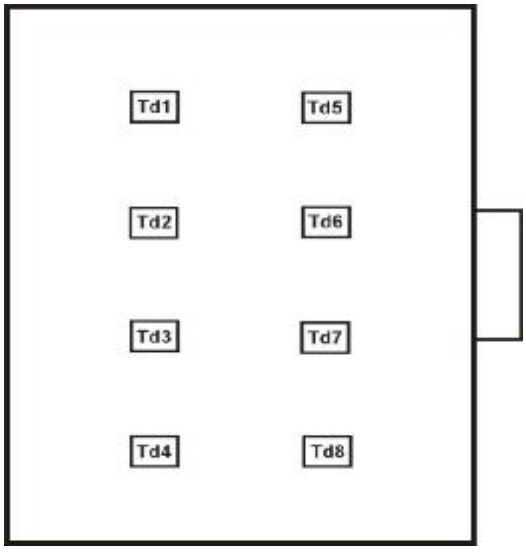


Measured values inside the test furnace

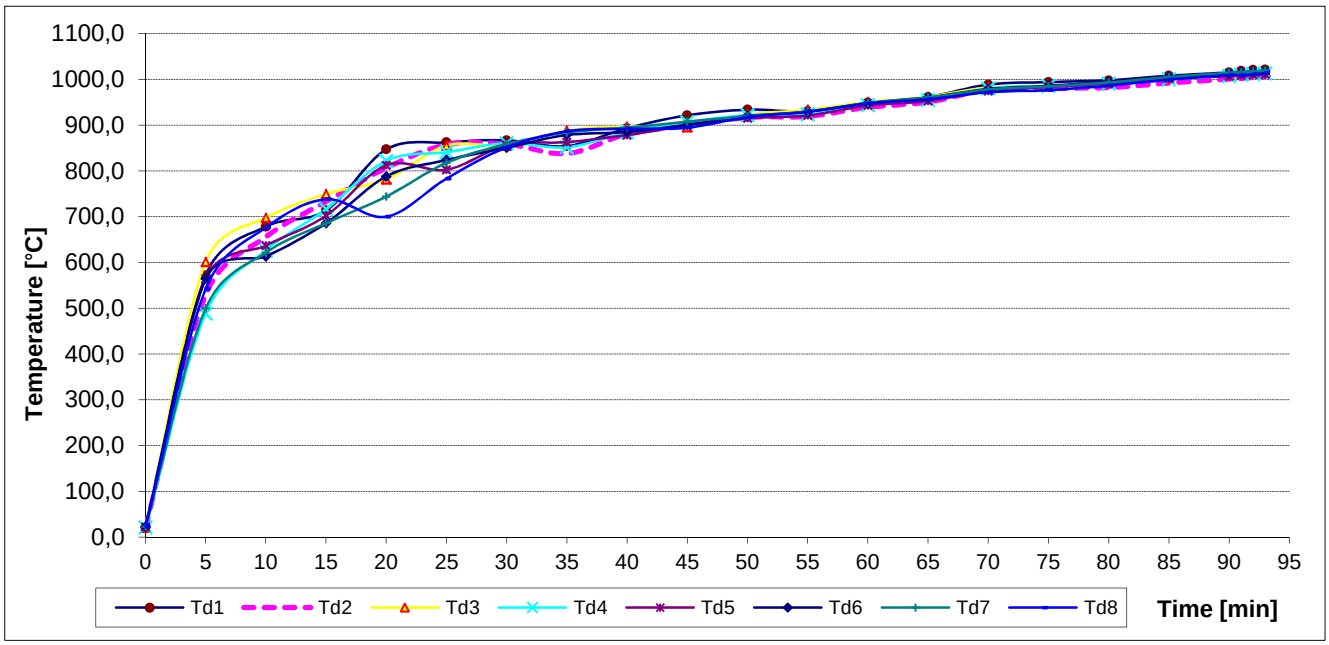
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	20,4	21,1	20,9	21,3	22,3	23,1	22,7	23,2	21,9	20,0	15,2	0,0	-1,3
5	572,1	529,4	601,3	488,6	564,3	564,5	499,8	542,2	545,3	576,0	15,3	-8,6	18,4
10	678,2	655,9	697,4	626,6	636,7	613,3	621,5	676,3	650,7	678,0	15,3	-7,2	17,6
15	713,8	733,1	749,4	716,4	702,4	686,0	685,9	738,1	715,6	739,0	15,4	-6,1	18,5
20	847,1	806,8	781,9	822,2	812,6	788,1	743,9	699,9	787,8	781,0	15,4	-4,0	18,8
25	862,5	857,6	855,3	840,9	802,7	823,9	817,8	783,3	830,5	815,0	15,5	-2,8	19,8
30	866,9	858,8	855,8	860,8	856,7	851,0	858,7	851,7	857,6	842,0	15,5	-2,0	18,5
35	854,3	837,9	888,4	851,7	863,0	878,6	883,8	886,5	868,0	865,0	15,6	-1,5	18,7
40	893,3	880,7	897,0	884,1	878,4	885,1	894,7	892,3	888,2	885,0	15,6	-1,1	18,5
45	921,5	899,0	895,6	906,7	899,7	901,0	907,5	894,6	903,2	902,0	15,7	-1,1	17,9
50	933,9	916,9	922,8	922,0	915,1	920,0	919,7	917,5	921,0	918,0	15,7	-0,9	17,4
55	930,3	919,3	934,0	923,7	921,4	929,3	930,0	929,3	927,2	932,0	15,8	-0,9	17,8
60	949,1	939,1	950,7	943,7	942,8	948,1	948,9	947,6	946,2	945,0	15,8	-0,8	18,3
65	961,4	950,5	962,3	955,0	953,1	960,5	960,5	956,5	957,5	957,0	15,9	-0,7	17,3
70	988,7	977,5	982,3	980,3	974,6	978,9	977,7	972,0	979,0	968,0	15,9	-0,6	17,9
75	994,0	980,3	984,9	985,9	983,4	985,9	984,9	976,5	984,5	979,0	16,0	-0,5	17,5
80	997,9	982,3	991,5	990,4	991,0	994,9	993,4	986,3	991,0	988,0	16,0	-0,4	19,1
85	1007,9	992,0	1002,4	1000,5	1001,6	1005,4	1005,0	999,3	1001,8	997,0	16,1	-0,4	19,6
90	1015,3	1000,6	1011,6	1007,6	1007,0	1013,8	1014,3	1009,7	1010,0	1006,0	16,1	-0,3	18,5
91	1018,7	1002,2	1013,0	1009,9	1008,9	1015,8	1015,3	1009,0	1011,6	1008,0	16,2	-0,3	17,4
92	1020,7	1004,3	1014,4	1011,7	1010,0	1017,1	1017,1	1010,9	1013,3	1009,0	16,1	-0,3	19,5
93	1021,3	1006,6	1016,3	1012,9	1010,7	1018,4	1019,5	1013,7	1014,9	1011,0	16,2	-0,3	18,8

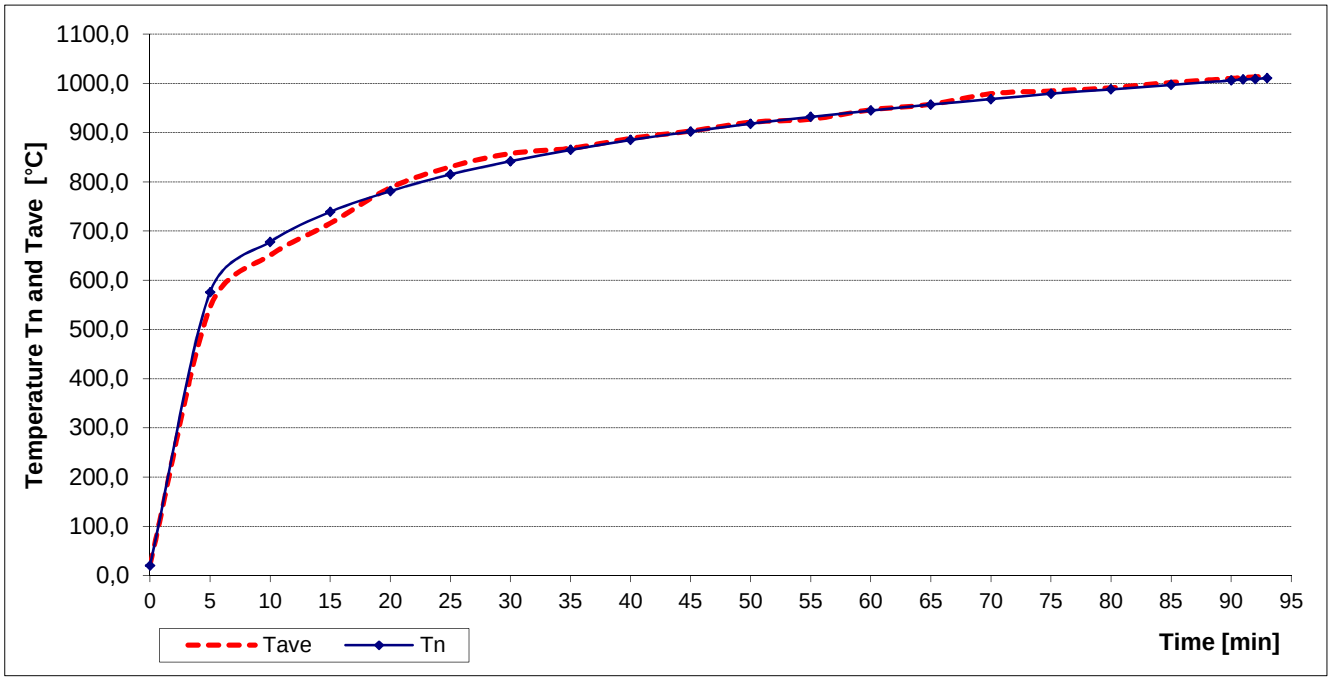
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

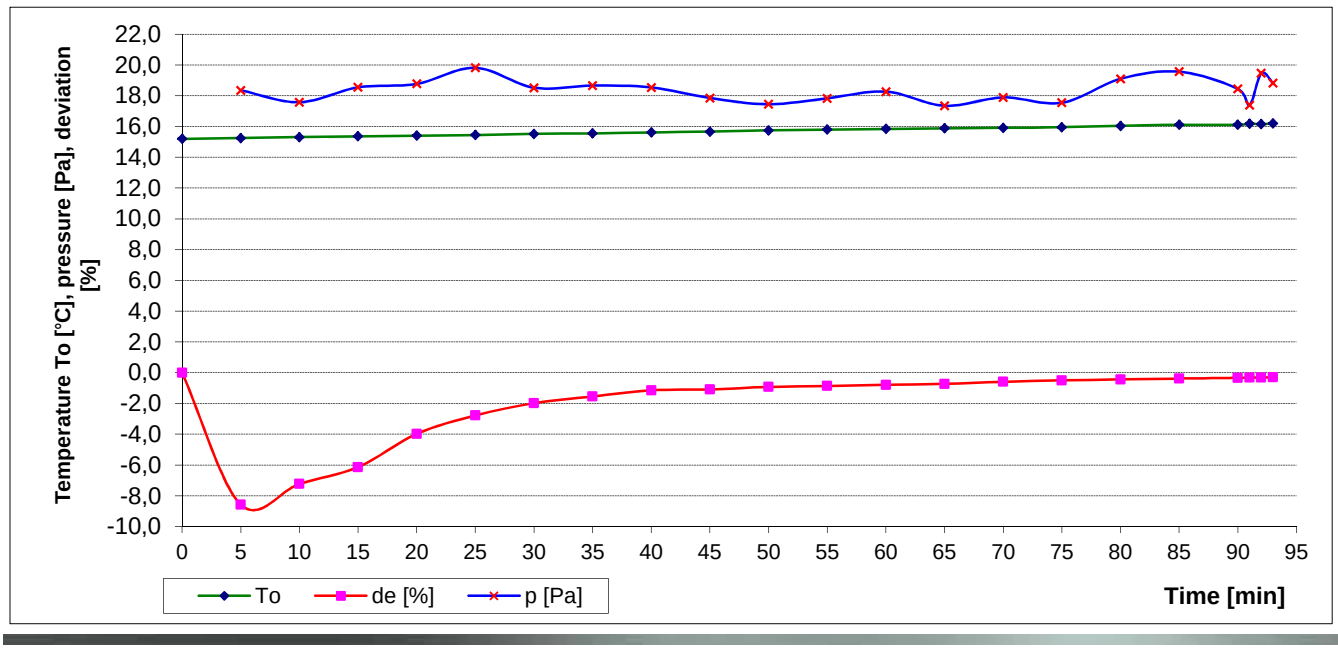
Layout of measuring points inside the test furnace:



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	x
	2-L2	x
	3-L3	38:21
	4-PEN	x
S2	5-L1	x
	6-L2	x
	7-L3	67:21
	8-PEN	x
S3	9-L1	x
	10-L2	51:32
	11-L3	x
	12-PEN	x
S4	13-L1	40:53
	14-L2	40:53
	15-L3	40:53
	16-PEN	x
S5	17-L1	x
	18-L2	x
	19-L3	69:30
	20-PEN	x
S6	21-L1	no failure / interruption
	22-L2	no failure / interruption
	23-L3	no failure / interruption
	24-PEN	no failure / interruption
S7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S9	33-L1	x
	34-L2	33:33
	35-L3	x
	36-PEN	x
S10	37-L1	89:41
	38-L2	89:41
	39-L3	89:41
	40-PEN	x

Specimen No.	Cables
1	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
2	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
3	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
4	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
5	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
6	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
7	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
8	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
9	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
10	2 cables (N)HXH 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 S11 to S20 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S11	41-L1	65:06
	42-L2	65:06
	43-L3	65:06
	44-PEN	x
S12	45-L1	54:44
	46-L2	54:44
	47-L3	54:44
	48-PEN	x
S13	49-L1	x
	50-L2	x
	51-L3	77:47
	52-PEN	x
S14	53-L1	42:38
	54-L2	x
	55-L3	x
	56-PEN	x
S15	57-L1	x
	58-L2	x
	59-L3	47:23
	60-PEN	x
S16	61-L1	x
	62-L2	x
	63-L3	37:25
	64-PEN	x
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	x
	74-L2	4:36
	75-L3	x
	76-PEN	x
S20	77-L1	x
	78-L2	x
	79-L3	56:58
	80-PEN	x

Specimen No.	Cables
11	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
12	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
13	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
14	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
15	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
16	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
17	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
18	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
19	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
20	2 cables (N)HXCH 4x1,5RE/1,5 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	x
	86-L2	x
	87-L3	55:08
	88-PEN	x
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	no failure / interruption
	94-L2	no failure / interruption
	95-L3	no failure / interruption
	96-PEN	no failure / interruption
S25	97-L1	80:54
	98-L2	x
	99-L3	80:54
	100-PEN	x
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	x
	106-L2	x
	107-L3	76:12
	108-PEN	x
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	x
	118-L2	80:19
	119-L3	x
	120-PEN	x

Specimen No.	Cables
21	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
22	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
23	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
24	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
25	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
26	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
27	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
28	2 cables BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV
29	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
30	2 cables (N)HXH 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 S31 to S40 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	no failure / interruption
	122-L2	no failure / interruption
	123-L3	no failure / interruption
	124-PEN	no failure / interruption
S32	125-L1	60:09
	126-L2	x
	127-L3	x
	128-PEN	x
S33	129-L1	53:39
	130-L2	x
	131-L3	53:39
	132-PEN	x
S34	133-L1	72:18
	134-L2	72:18
	135-L3	x
	136-PEN	x
S35	137-L1	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	x
	142-L2	x
	143-L3	78:01
	144-PEN	x
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S39	153-L1	x
	154-L2	73:55
	155-L3	x
	156-PEN	x
S40	157-L1	x
	158-L2	68:08
	159-L3	x
	160-PEN	x

Specimen No.	Cables
31	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
32	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
33	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
34	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
35	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
36	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV
37	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
38	2 cables BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV
39	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
40	2 cables BiTflame 1000 C 4x1,5RE/1,5 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 specimen S52 to S61 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	59:47
	210-PEN	-
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	33:03
	216-PEN	-
S54A	217-L	76:31
	218-PEN	-
S54B	219-L	80:40
	220-PEN	-
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	37:42
	234-PEN	-
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	85:21
	240-PEN	-
S60A	241-L	no failure / interruption
	242-PEN	no failure / interruption
S60B	243-L	58:01
	244-PEN	-
S61A	245-L	57:53
	246-PEN	-
S61B	247-L	52:49
	248-PEN	-

Specimen No.	Cables
52, 54A, 55B, 59, 60B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
53A, 55A, 58B	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
53B, 58A, 61	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V
54B, 56B, 57B, 60A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
56A, 57A	2 cables HTKSHekw 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	44:48
	250-PEN	-
S62B	251-L	no failure / interruption
	252-PEN	no failure / interruption
S63A	253-L	no failure / interruption
	254-PEN	no failure / interruption
S63B	255-L	no failure / interruption
	256-PEN	no failure / interruption
S64A	257-L	no failure / interruption
	258-PEN	no failure / interruption
S64B	259-L	66:48
	260-PEN	-
S65A	261-L	no failure / interruption
	262-PEN	no failure / interruption
S65B	263-L	45:34
	264-PEN	-
S66A	265-L	no failure / interruption
	266-PEN	no failure / interruption
S66B	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	no failure / interruption
	270-PEN	no failure / interruption
S67B	271-L	no failure / interruption
	272-PEN	no failure / interruption
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	no failure / interruption
	278-PEN	no failure / interruption
S69B	279-L	no failure / interruption
	280-PEN	no failure / interruption
S70A	281-L	no failure / interruption
	282-PEN	no failure / interruption
S70B	283-L	no failure / interruption
	284-PEN	no failure / interruption
S71A	285-L	no failure / interruption
	286-PEN	no failure / interruption
S71B	287-L	no failure / interruption
	288-PEN	no failure / interruption

Specimen No.	Cables
62A, 66, 68B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
64A, 65A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
64B, 65B	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V
62B, 67B, 68A, 69A, 70A, 71A	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
67A, 69B, 70B, 71B	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V
63A	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + **firebox PMO1**
63B	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + **firebox PMO2**

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

Measured time of tested specimens S72 to S73 - 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	69:36
	294-PEN	-
S73B	295-L	48:28
	296-PEN	-

Specimen No.	Cables
72, 73B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
73A	2 cables HLGs 2x1,0 FE180/PH90/E90 300/500V

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

PHOTOS

Photo taken before the test.

Photo taken before the test.

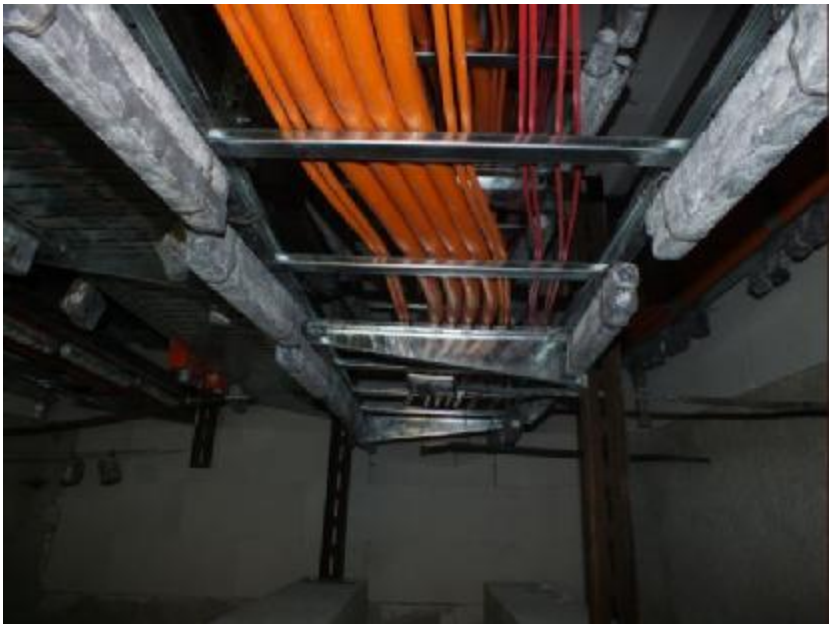


Photo taken before the test.

PHOTOS

Photo taken before the test.

Photo taken before the test.

Photo taken before the test.

PHOTOS

Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

PHOTOS

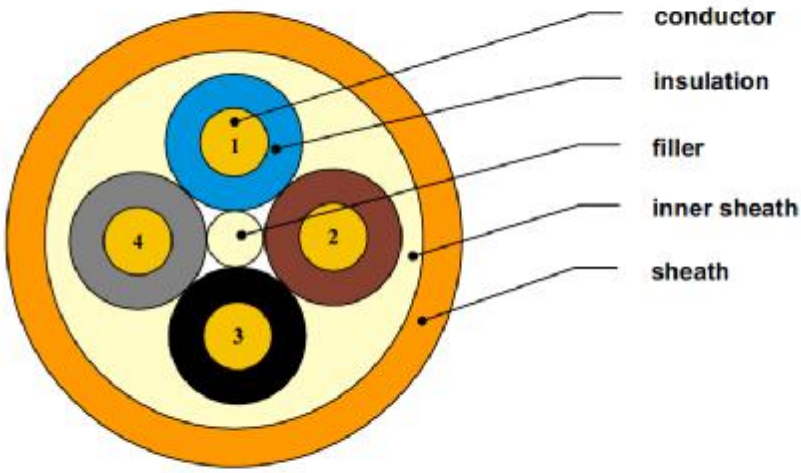
Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

(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

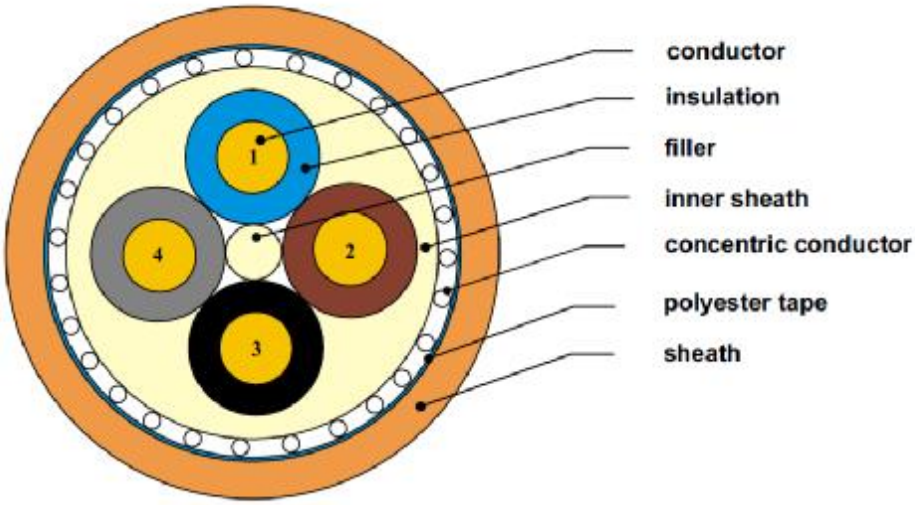
Operating voltage	0,6/1kV
Voltage test	4000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{12}

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	DIN VDE 0266

CABLES

(N)HXCH FE180/E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



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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 coper 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

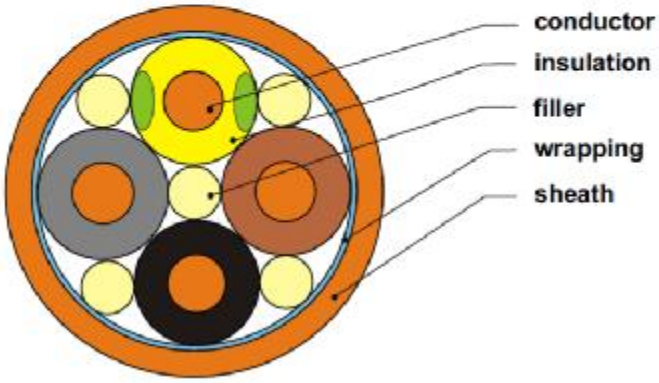
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5/1,5 ÷ 240/120
7	1,5/1,5 ÷ 4/4
10 ÷ 30	1,5/2,5 ÷ 2,5/10

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	-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	DIN VDE 0266

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 16mm^2)
wrapping - polyester tape
sheath - flame resistant, halogen free polymer compound

BiTflame 1000 FE180/E90

CHARACTERISTICS

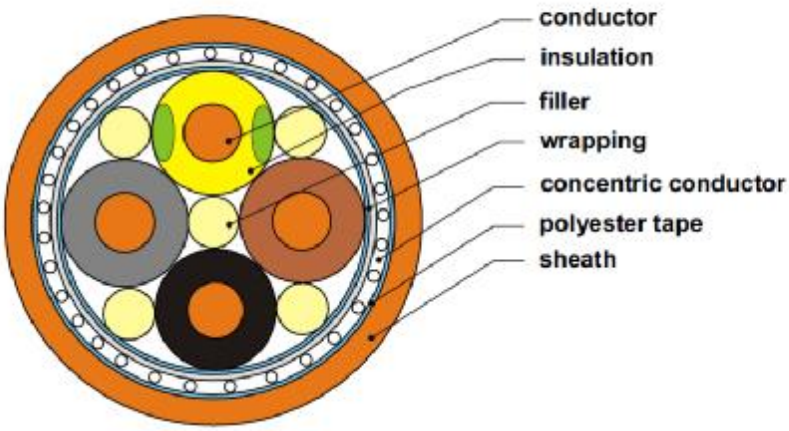
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 5	1,5 ÷ 300
7 ÷ 10	1,5 ÷ 10
10 ÷ 48	1,5 ÷ 2,5

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

BiTflame 1000C FE180/E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

Safety cables are used in all locations where a special protection against firhhe 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 coper wires with counter copper tape
polyester tape
sheath - flame resistant, halogen free polymer compound

BiTflame 1000C FE180/E90

CHARACTERISTICS

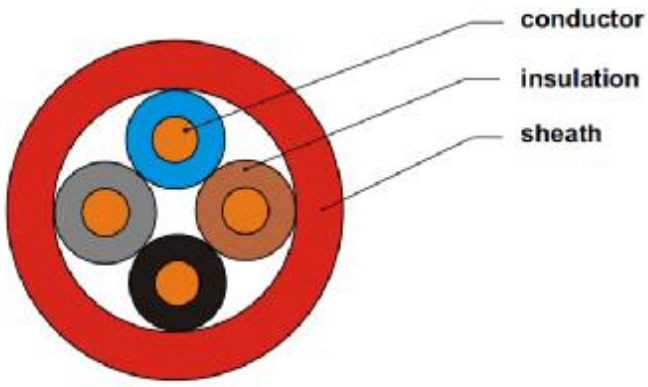
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5/1,5 ÷ 240/120
7	1,5/1,5 ÷ 4/4
10 ÷ 30	1,5/2,5 ÷ 2,5/10

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 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

HDGs FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE



APPLICATIONS

Halogen-free fire resistant cables are designed for instalation in places where it is necessary to ensure operation of devices under fire conditions.There are recommended for emergency lighting instalations, 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

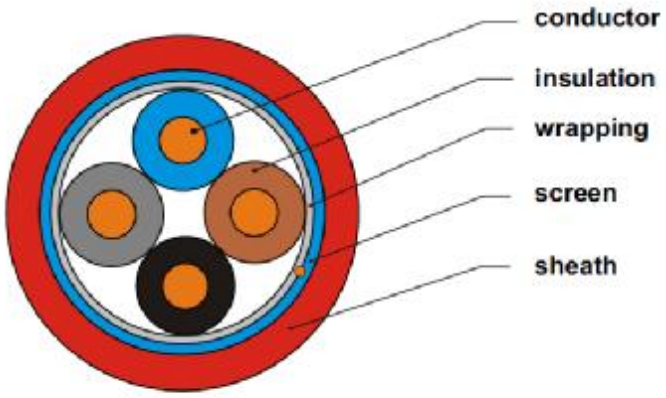
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage	300/500 V
Voltage test	
core/core	2000 V, 50 Hz
core/screen	2000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{11}

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

HDGsekwf FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE



APPLICATIONS

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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

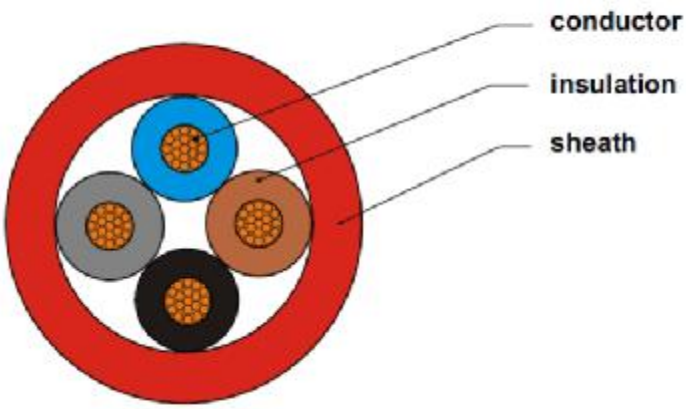
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage	300/500 V
Voltage test	
core/core	2000 V, 50 Hz
core/screen	2000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{11}

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

HLGs FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE



APPLICATIONS

Halogen-free fire resistant cables are designed for instalation in places where it is necessary to ensure operation of devices under fire conditions.There are recommended for emergency lighting instalations, 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

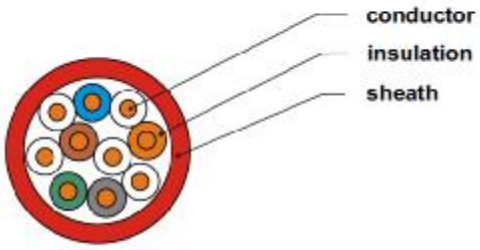
Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage	300/500 V
Voltage test core/core	2000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{11}

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

HTKSH 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
sheath - flame resistant, halogen free polymer compound

HTKSH FE180/PH90/E90

CHARACTERISTICS

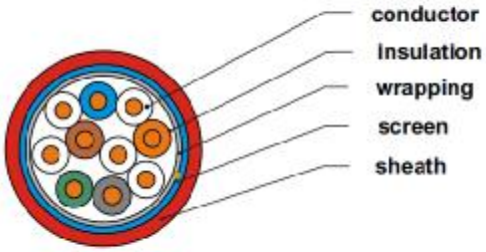
Conductor cross-section	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x .... 20 x 2 x	0,8
1 x 2 x .... 10 x 2 x	1,0
1 x 2 x .... 10 x 2 x	1,4
1 x 2 x .... 10 x 2 x	1,8
1 x 2 x .... 10 x 2 x	2,3
1 x 2 x .... 10 x 2 x	2,8

Operating voltage	225V
Voltage test core/core	1500 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{11}

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

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

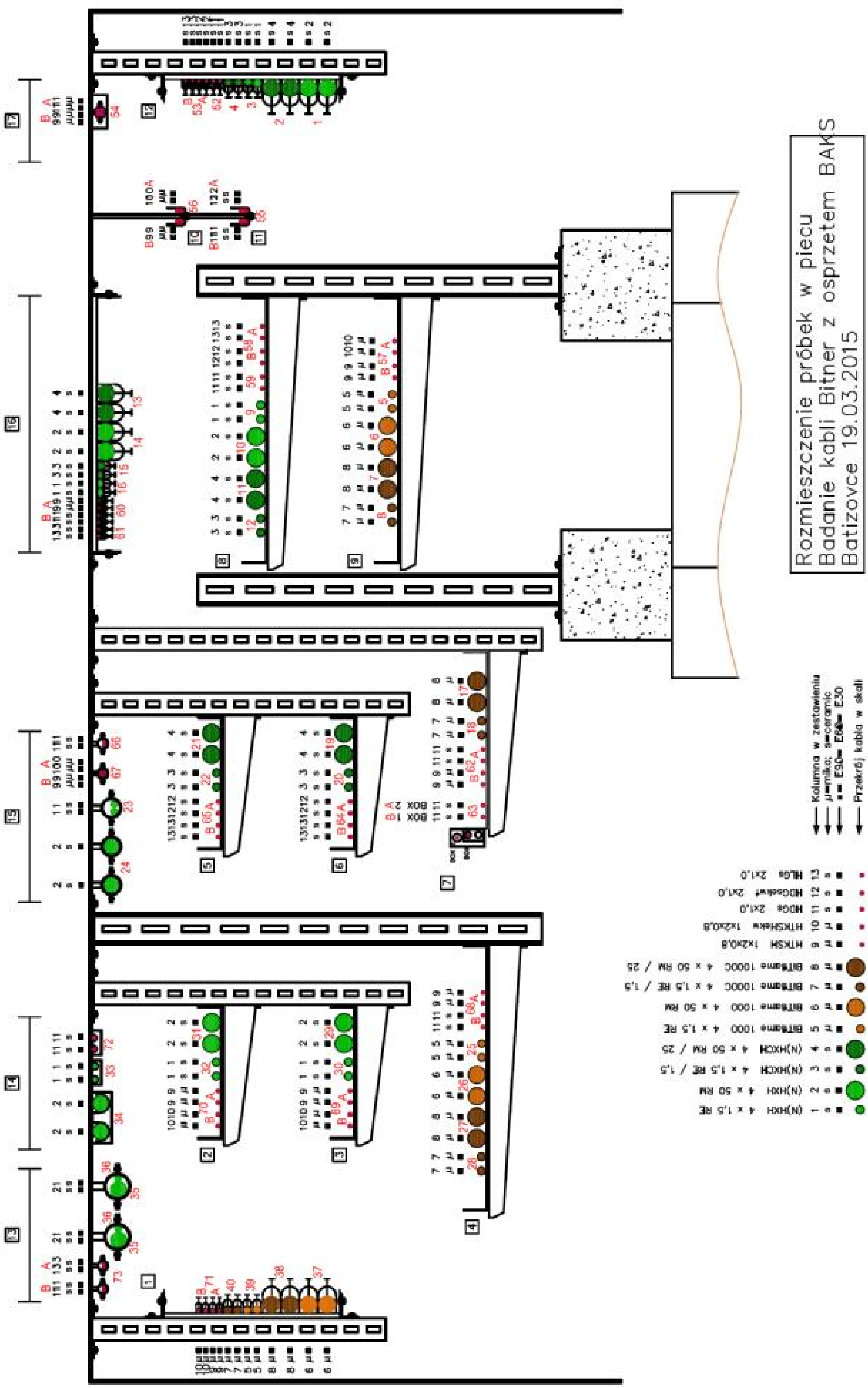
CHARACTERISTICS

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

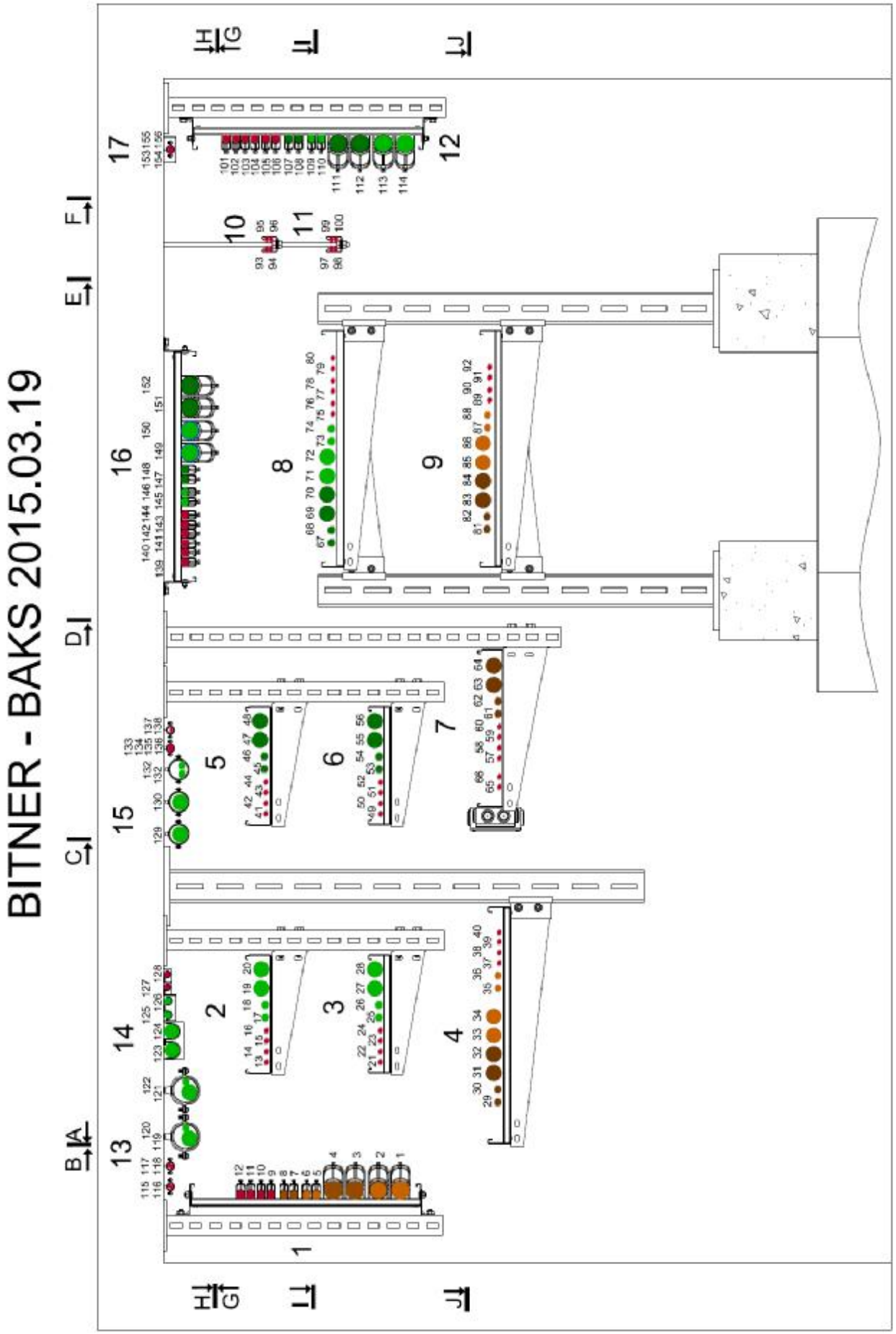
Operating voltage	225V
Voltage test core/core	1500 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{11}

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

DRAWINGS


Rozmieszczenie próbek w piecu
Badanie kabli Bitner z osprzetem BAKS
Batizovce 19.03.2015

DRAWINGS



DRAWINGS

No	No Fires	Cable type	Position	Construction
1	37	BiTflame 1000 4x50RM FE180/E90 0,6/1kV	1	Drabinka DUP/DUOP 600H 60/... / 1.5 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCB 1000, uchwyt trójkąty UTM/UTMO
2		BiTflame 1000 4x50RM FE180/E90 0,6/1kV		
3	38	BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
4		BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
5	39	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
6		BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
7	40	BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
8		BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
9	71A	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
10		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
11	71B	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
12		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
13	70B	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	2	Korytko kablowe KGL300H60/… 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Wspornik WPCB 1000, Wysięgnik WWS/WWSO300
14		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
15	70A	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
16		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
17	32	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
18		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
19	31	(N)HXH 4x50RM FE180/E90 0,6/1kV		
20		(N)HXH 4x50RM FE180/E90 0,6/1kV		
21	69B	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	3	Drabina kablowa DUP/DUOP300H60/… 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPCB 1000, Wysięgnik WWS/WWSO300
22		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
23	69A	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
24		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
25	30	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
26		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
27	29	(N)HXH 4x50RM FE180/E90 0,6/1kV		
28		(N)HXH 4x50RM FE180/E90 0,6/1kV		
29	28	BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	4	Drabina kablowa DUP/DUOP600H60/… 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPDH 1200, Wysięgnik WWCH600
30		BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
31	27	BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
32		BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
33	26	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		
34		BiTflame 1000 4x50RM FE180/E90 0,6/1kV		
35	25	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
36		BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
37	68B	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
38		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
39	68A	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
40		HTKSH 1x2x0,8 FE180/PH90/E90 225V		

DRAWINGS

No	No Fires	Cable type	Position	Construction
41	65B	HLGs 2x1,0 FE180/PH/90/E90 300/500V	5	Korytko kablowe KGL300H60/… 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Wspornik WPCB 1000, Wysięgnik WWS/WWSO300
42		HLGs 2x1,0 FE180/PH/90/E90 300/500V		
43	65A	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
44		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
45	22	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
46		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
47	21	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
48		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
49	64B	HLGs 2x1,0 FE180/PH/90/E90 300/500V	6	Drabina kablowa DUP/DUOP300H60/… 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPCB 1000, Wysięgnik WWS/WWSO300
50		HLGs 2x1,0 FE180/PH/90/E90 300/500V		
51	64A	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
52		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
53	20	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
54		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
55	19	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
56		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
57	62B	HTKSH 1x2x0,8 FE180/PH90/E90 225V	7	Korytko kablowe KGJ400H60/… 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPCB 1200, Wysięgnik WWS/WWSO400
58		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
59	62A	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
60		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
61	18	BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
62		BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
63	17	BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
64		BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
65	63B	HDGs 2x1,0 FE180/PH90/E90 300/500V BOX1		
66	63A	HDGs 2x1,0 FE180/PH90/E90 300/500V BOX2		
67	12	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	8	Drabina kablowa DUP/DUOP600H60/… 1m /40kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPDH 1000, Wysięgnik WWCH600
68		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
69	11	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
70		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
71	10	(N)HXH 4x50RM FE180/E90 0,6/1kV		
72		(N)HXH 4x50RM FE180/E90 0,6/1kV		
73	9	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
74		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
75	59	HDGs 2x1,0 FE180/PH90/E90 300/500V		
76		HDGs 2x1,0 FE180/PH90/E90 300/500V		
77	58B	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
78		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
79	58A	HLGs 2x1,0 FE180/PH90/E90 300/500V		
80		HLGs 2x1,0 FE180/PH90/E90 300/500V		

DRAWINGS

No	No Fires	Cable type	Position	Construction
81	8	BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	9	Drabina kablowa DUP/DUOP600H60/… 1m /40kg/m / grubość blachy 1,5 mm Mocowanie: Wspornik WPDH 1000, Wysięgnik WWCH600
82		BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV		
83	7	BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
84		BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV		
85	6	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		
86		BiTflame 1000 4x50RM FE180/E90 0,6/1kV		
87	5	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
88		BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		
89	57B	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
90		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
91	57A	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
92		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
93	56B	HTKSH 1x2x0,8 FE180/PH90/E90 225V	10	Ceownik CWP40H40 1,5m /4kg/m / grubość blachy 1,5 mm Mocowanie na pręcie gwintowanym PGM8
94		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
95	56A	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
96		HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		
97	55B	HDGs 2x1,0 FE180/PH90/E90 300/500V	11	
98		HDGs 2x1,0 FE180/PH90/E90 300/500V		
99	55A	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
100		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
101	53B	HLGs 2x1,0 FE180/PH90/E90 300/500V	12	Drabinka DUP/DUOP 600H 60/... / 1.5 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : Wspornik WPCB 1000, uchwyt trójkąty UTM/UTMO
102		HLGs 2x1,0 FE180/PH90/E90 300/500V		
103	53A	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
104		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
105	52	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
106		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
107	4	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
108		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
109	3	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
110		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
111	2	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
112		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
113	1	(N)HXH 4x50RM FE180/E90 0,6/1kV		
114		(N)HXH 4x50RM FE180/E90 0,6/1kV		
115	73B	HDGs 2x1,0 FE180/PH90/E90 300/500V	13	Rury stalowe RU o średnicy Fi 15-63,5mm Mocowanie co 1,5m do betonu za pomocą obejm OBS
116		HDGs 2x1,0 FE180/PH90/E90 300/500V		
117	73A	HLGs 2x1,0 FE180/PH90/E90 300/500V		
118		HLGs 2x1,0 FE180/PH90/E90 300/500V		
119	35	(N)HXH 4x50RM FE180/E90 0,6/1kV		
120	36	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
121	35	(N)HXH 4x50RM FE180/E90 0,6/1kV		
122	36	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		

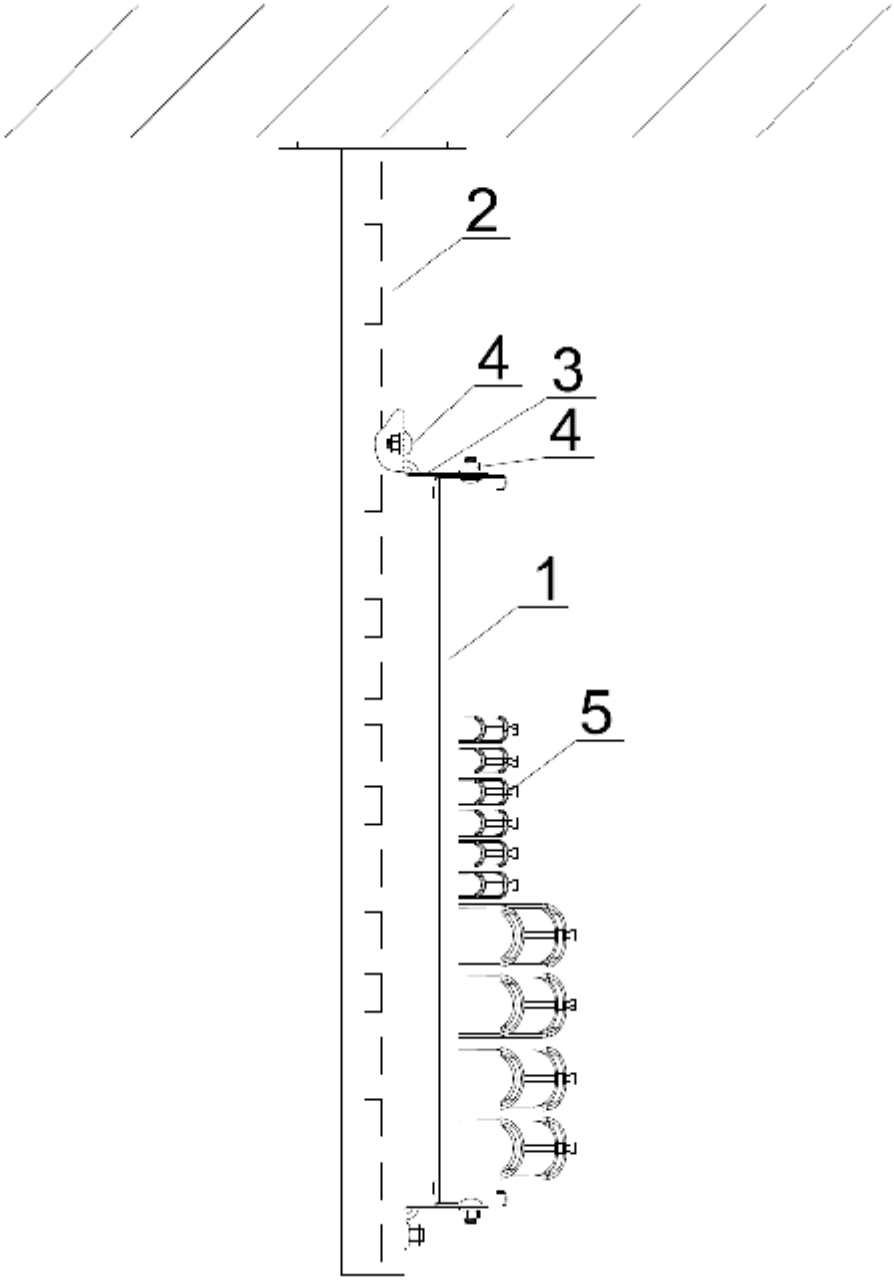
DRAWINGS

No	No Fires	Cable type	Position	Construction
123	34	(N)HXH 4x50RM FE180/E90 0,6/1kV	14	Listwy elektroinstalacyjne PVC, Mocowanie: UDF co 600 mm
124		(N)HXH 4x50RM FE180/E90 0,6/1kV		
125	33	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
126		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
127	72	HDGs 2x1,0 FE180/PH90/E90 300/500V		
128		HDGs 2x1,0 FE180/PH90/E90 300/500V		
129	24	(N)HXH 4x50RM FE180/E90 0,6/1kV	15	Obejma KSA mocowana co 600mm
130		(N)HXH 4x50RM FE180/E90 0,6/1kV		
131	23	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
132		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
133	67B	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
134		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
135	67A	HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
136		HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
137	66	HDGs 2x1,0 FE180/PH90/E90 300/500V		
138		HDGs 2x1,0 FE180/PH90/E90 300/500V		
139	61	HLGs 2x1,0 FE180/PH90/E90 300/500V	16	Drabinka DUP/DUOP 600H 60/... / 1.5 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : uchwyt trójkąty UTM/UTMO
140		HLGs 2x1,0 FE180/PH90/E90 300/500V		
141	60B	HDGs 2x1,0 FE180/PH90/E90 300/500V		
142		HDGs 2x1,0 FE180/PH90/E90 300/500V		
143	60A	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
144		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
145	16	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
146		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
147	15	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
148		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
149	14	(N)HXH 4x50RM FE180/E90 0,6/1kV		
150		(N)HXH 4x50RM FE180/E90 0,6/1kV		
151	13	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
152		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
153	54B	HTKSH 1x2x0,8 FE180/PH90/E90 225V	17	Listwy elektroinstalacyjne PVC, Mocowanie: KSA co 600 mm
154		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
155	54A	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
156		HDGs 2x1,0 FE180/PH/90/E90 300/500V		

DRAWINGS

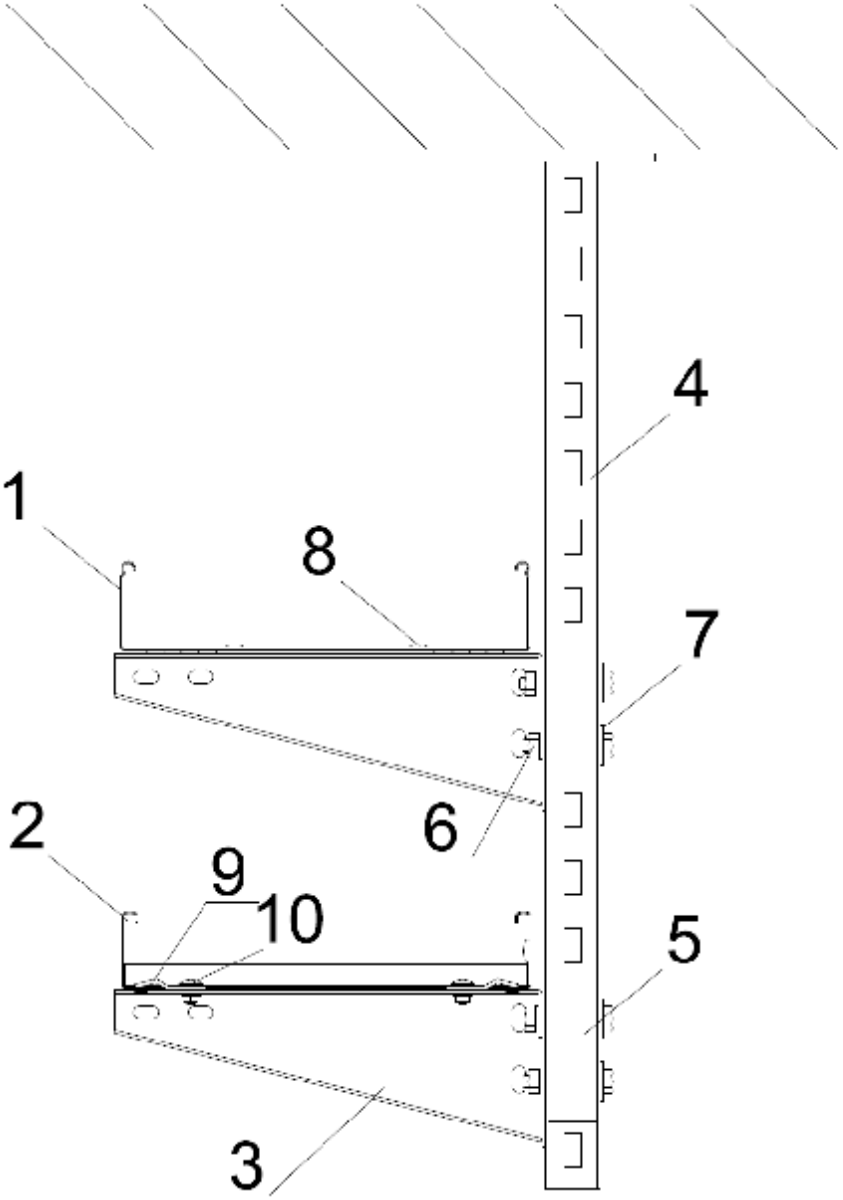
No.	Cable type	Cross-section [mm]	Weight [kg/m]
1	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	13,1	0,24
2	(N)HXH 4x50RM FE180/E90 0,6/1kV	34,9	2,85
3	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	14,7	0,30
4	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	36,9	3,10
5	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	12,5	0,20
6	BiTflame 1000 4x50RM FE180/E90 0,6/1kV	33,0	2,50
7	BiTflame 1000 C 4x1,5RE/1,5 FE180/E90 0,6/1kV	14,0	0,25
8	BiTflame 1000 C 4x50RM/25 FE180/E90 0,6/1kV	36,0	2,80
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	6,9	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

DRAWINGS



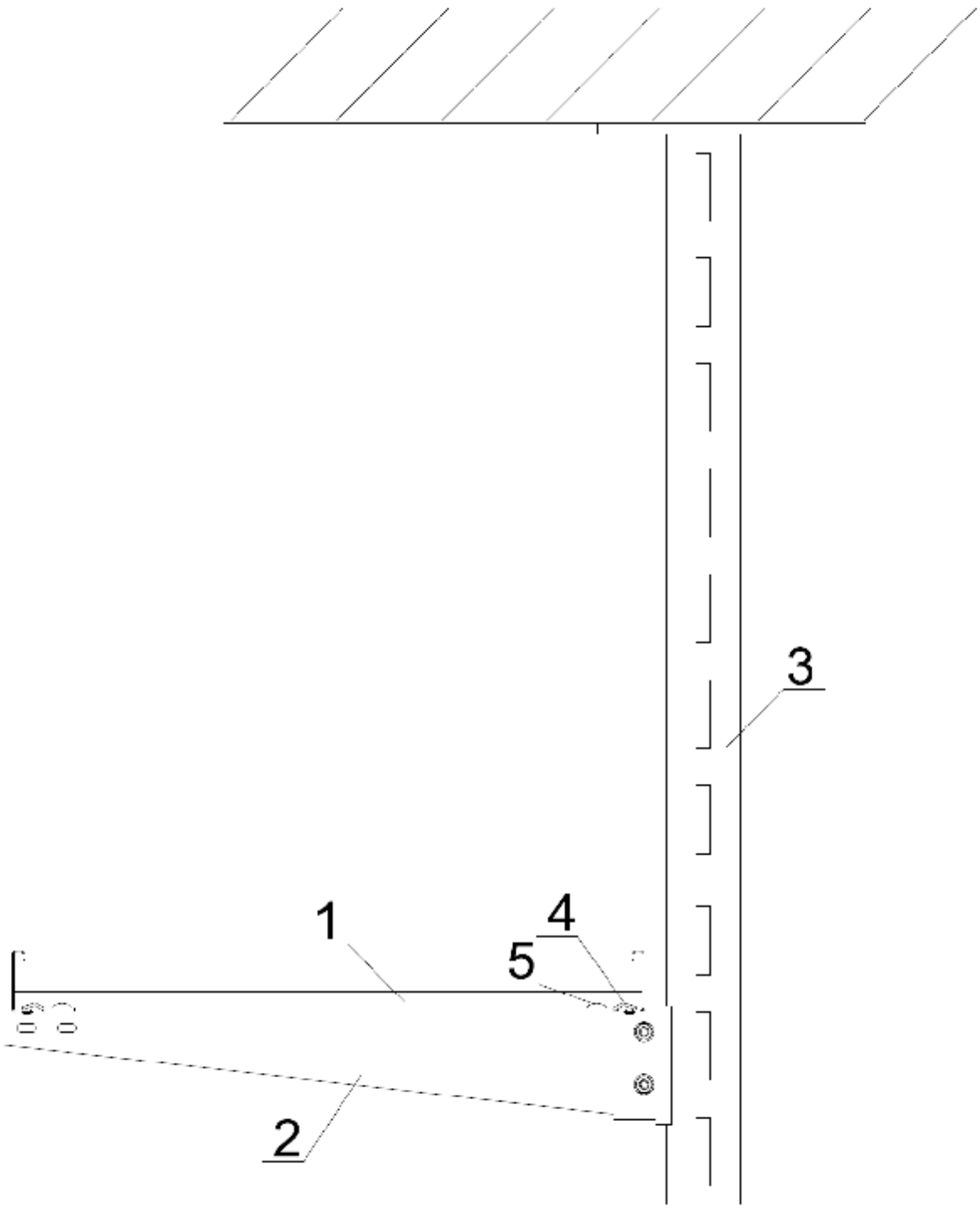
L.p.	Nazwa	Symbol	Szt.
5	Uchwyt kablowy	UK/UKO1	
4	Śruba z łbem grzybkowym	SGKM8x14	4
3	Uchwyt trójkątny	UTM/UTMO	2
2	Wspornik sufitowy	WPCB...	1
1	Drabina	DUP/DUOP600H60/...	1

DRAWINGS



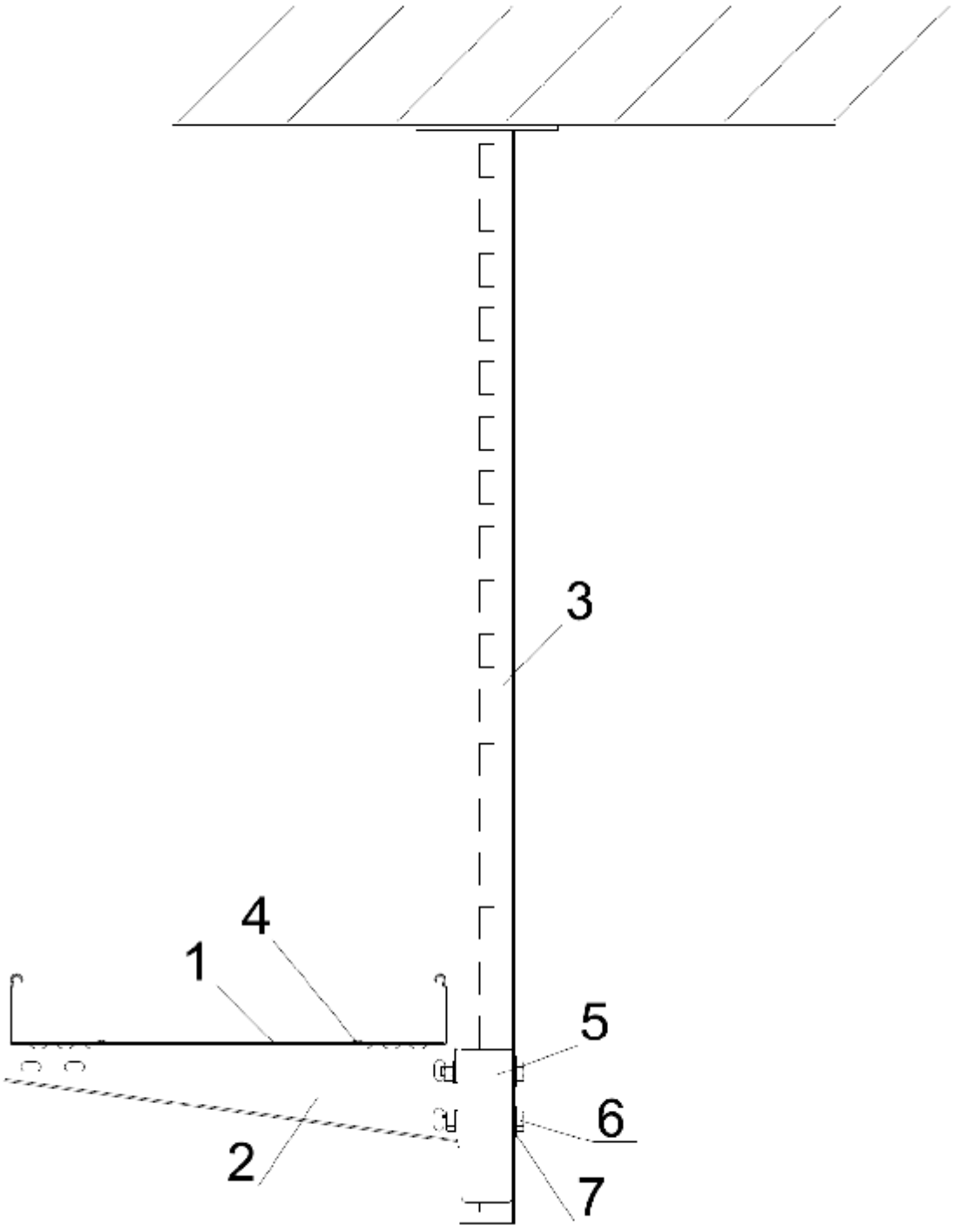
L.p.	Nazwa	Symbol	Szt.
10	Śruba z łbem grzybkowym	SGKM8x14	2
9	Zacisk mocujący	ZM/ZMO	2
8	Śruba z łbem grzybkowym	SGKM6x12	2
7	Podkładka powiększona	PW10	4
6	Śruba M10	SMM10x80	4
5	Blacha rozporowa	BR55	2
4	Wspornik sufitowy	WPCB...	1
3	Wysięgnik	WWS/WWSO300	2
2	Drabina	DUP/DUOP300H60/...	1
1	Koryto	KGL/KGOL300H60/...	1

DRAWINGS



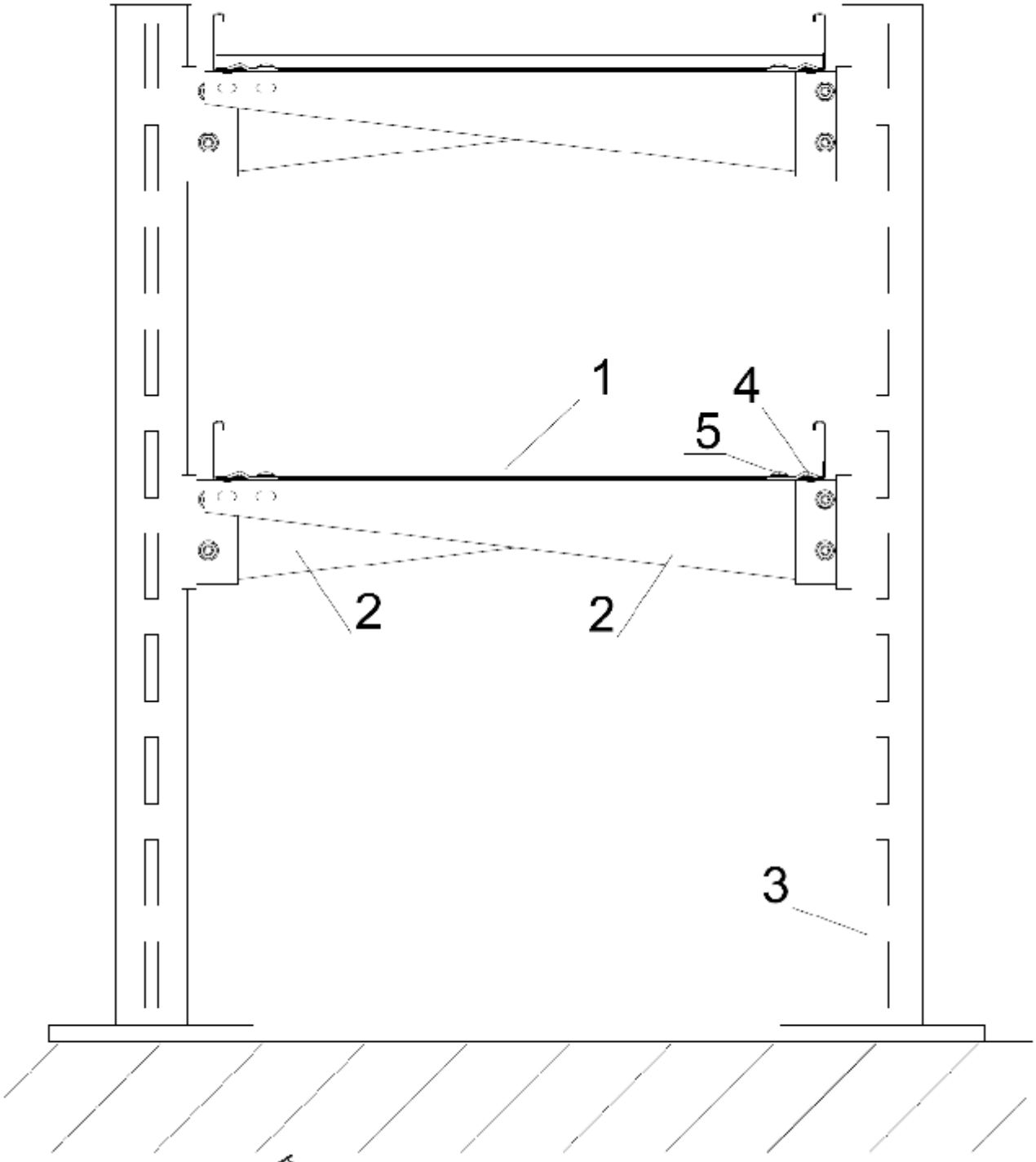
L.p.	Nazwa	Symbol	Szt.
5	Śruba z łbem grzybkowym	SGKM8x14	2
4	Zacisk mocujący	ZM/ZMO	2
3	Wspornik hutniczy	WPDH...	1
2	Wysięgnik	WWCH600	1
1	Drabina	DUP/DUOP600H60/...	1

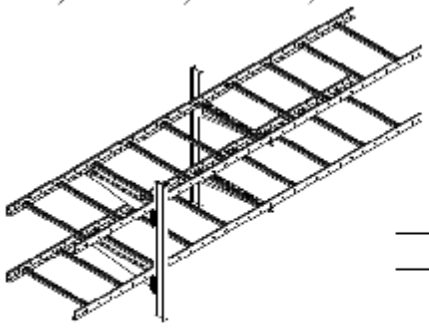
DRAWINGS



L.p.	Nazwa	Symbol	Szt.
7	Podkładka powiększona	PW10	2
6	Śruba	SM M10x80	2
5	Blacha rozporowa	BR55	1
4	Śruba z łbem grzybkowym	SGKM6x12	2
3	Wspornik	WPCB...	1
2	Wysięgnik	WWS/WWSO400	1
1	Koryto	KGJ/KGOJ400H60/...	1

DRAWINGS

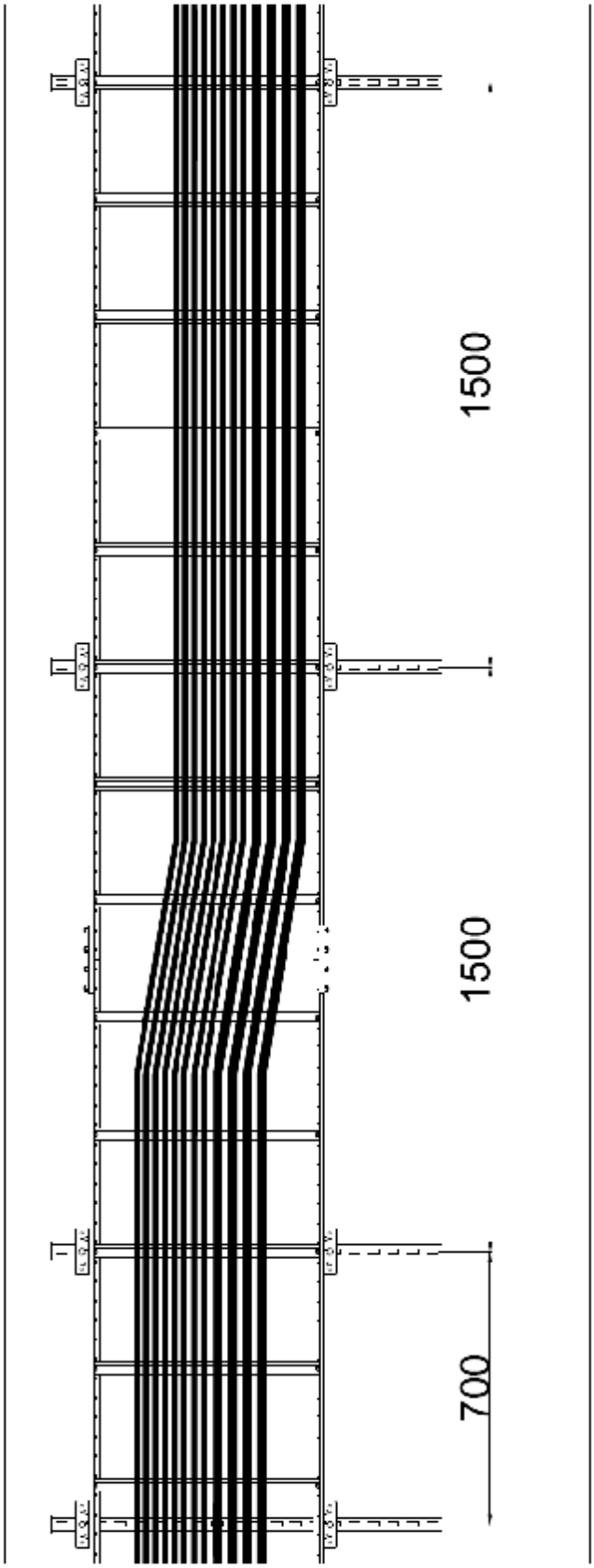




L.p.	Nazwa	Symbol	Szt.
5	Śruba z łbem grzybkowym	SGKM8x14	2
4	Zacisk mocujący	ZM/ZMO	2
3	Wspornik hutniczy	WPDH...	1
2	Wysięgnik	WWCH600	2
1	Drabina	DUP/DUOP600H60/...	2

DRAWINGS

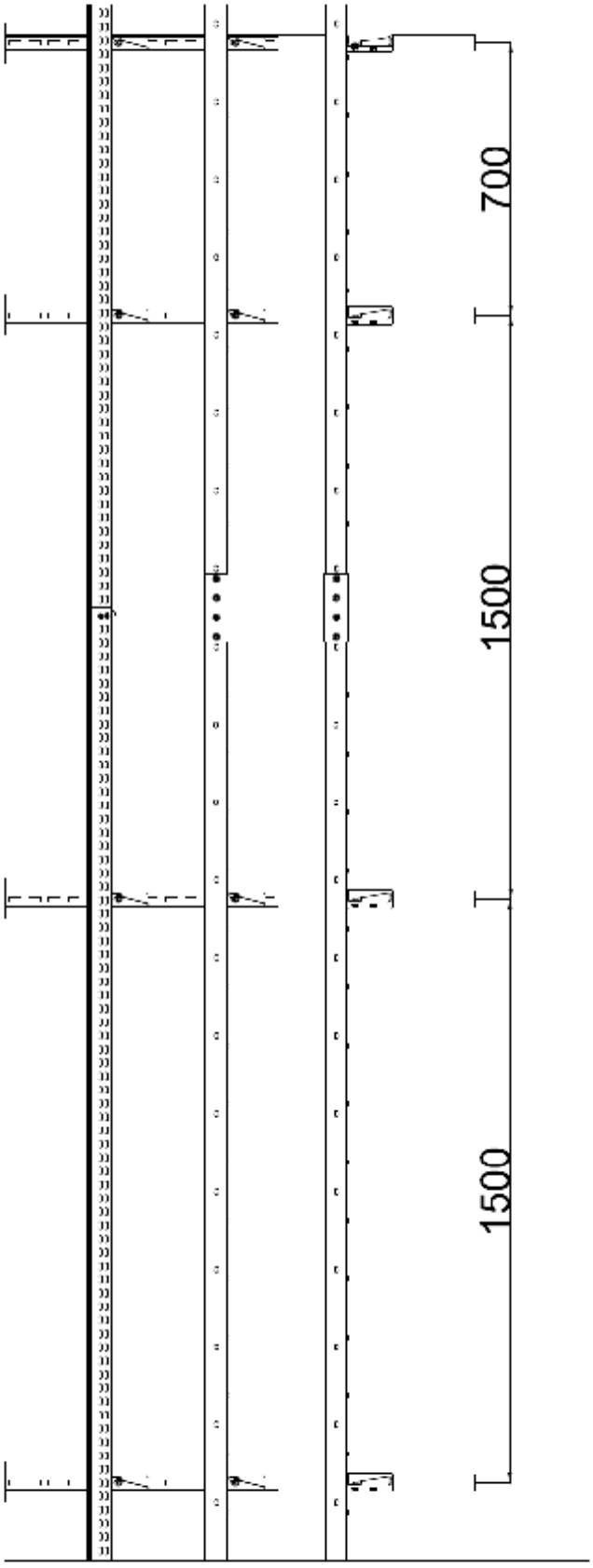
BITNER - BAKS 2015.03.19



A-A

DRAWINGS

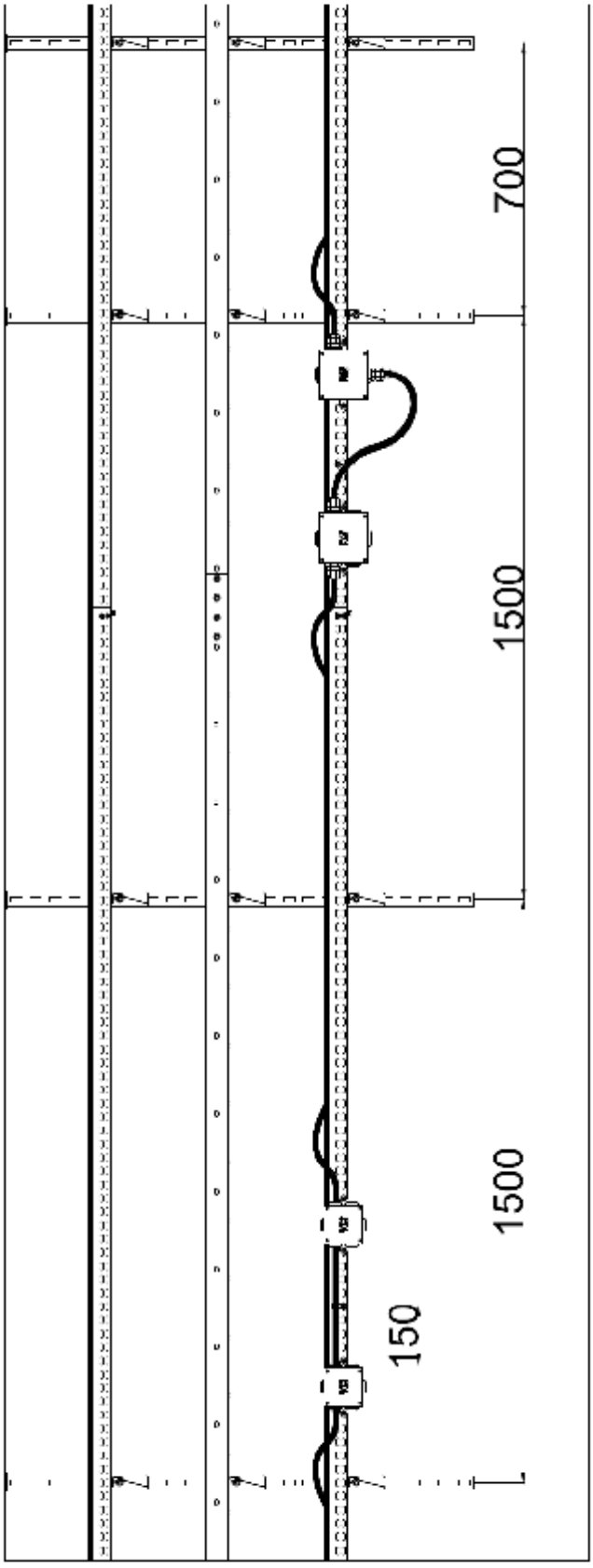
BITNER - BAKS 2015.03.19



B-B

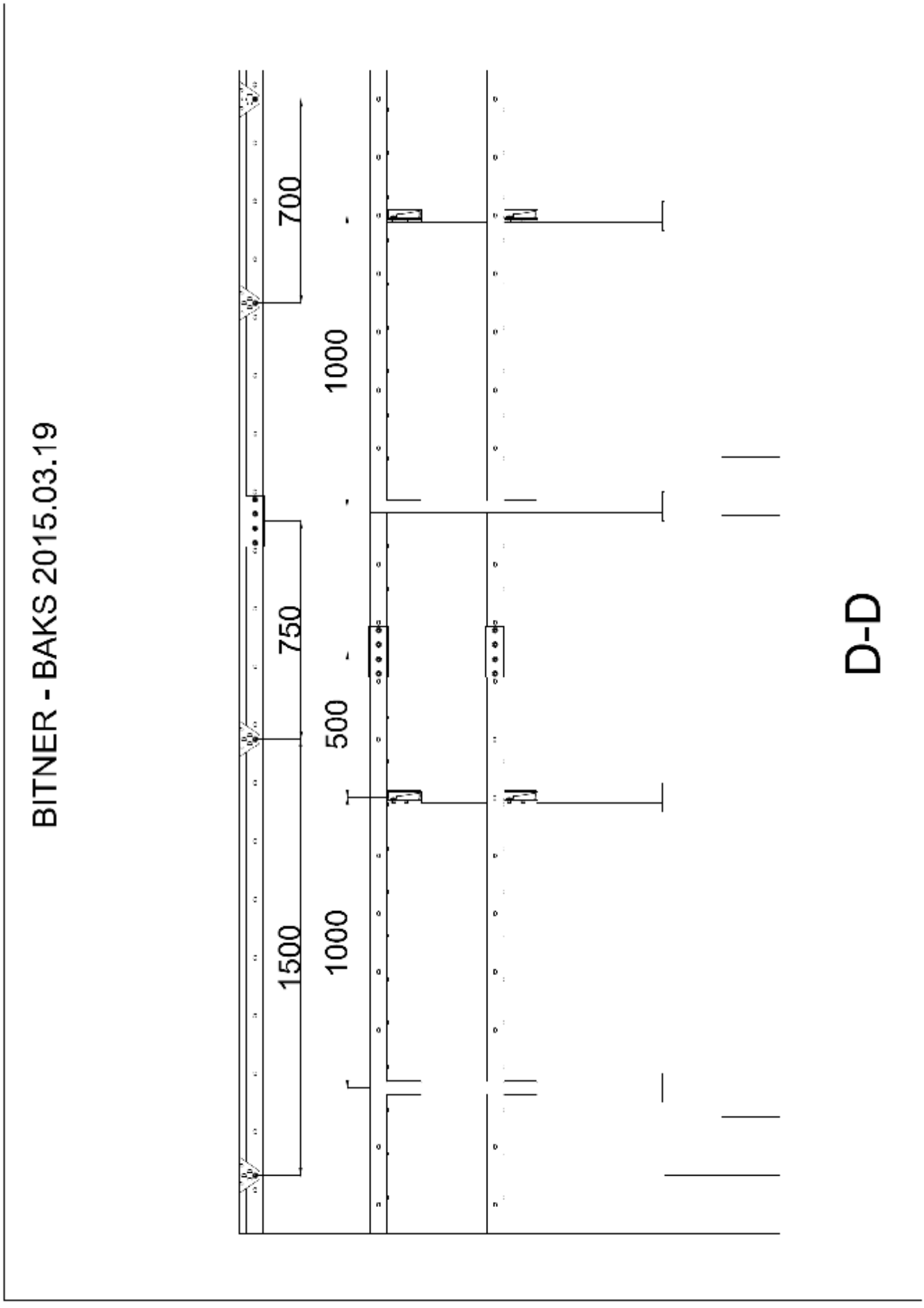
DRAWINGS

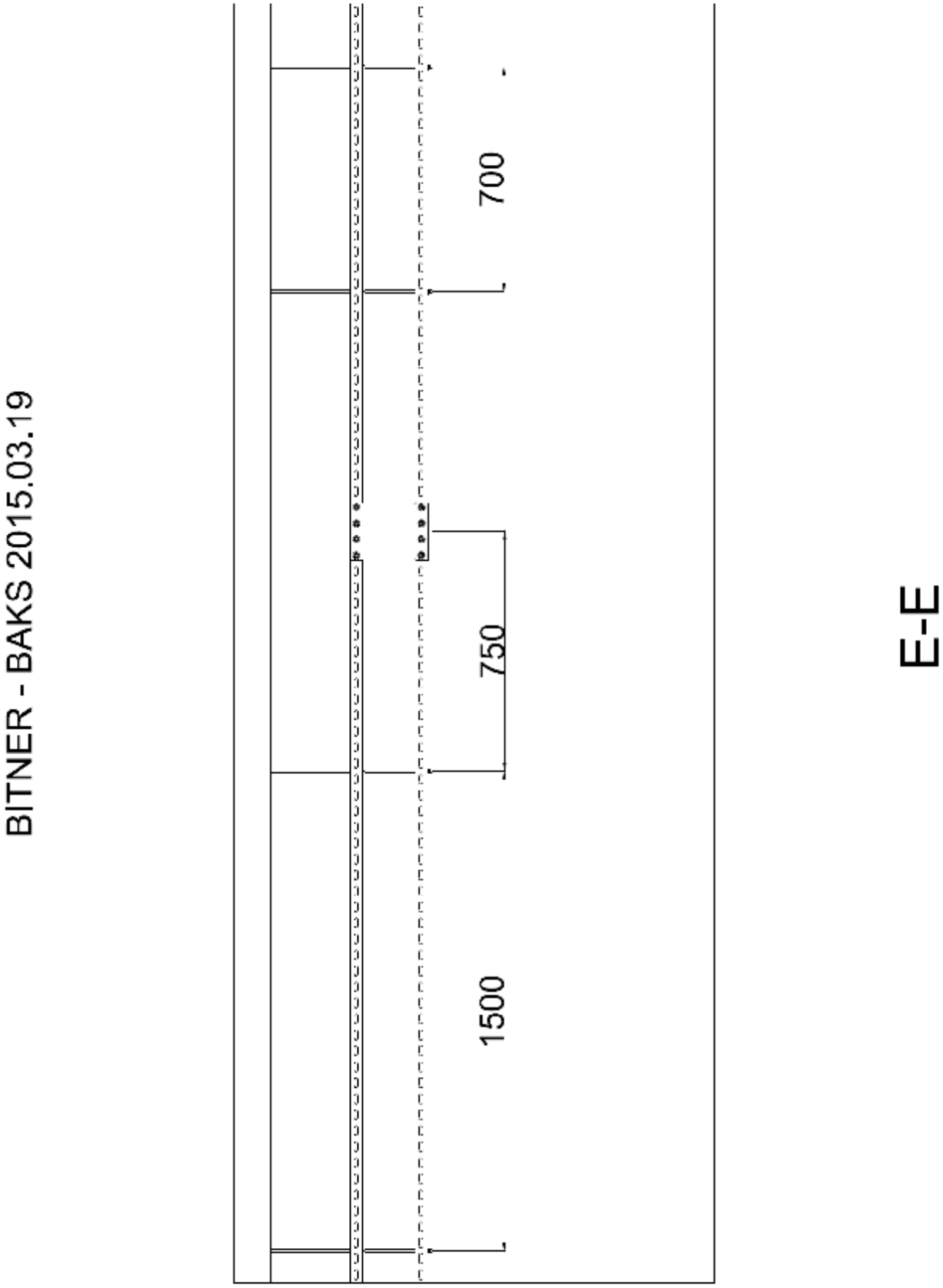
BITNER - BAKS 2015.03.19



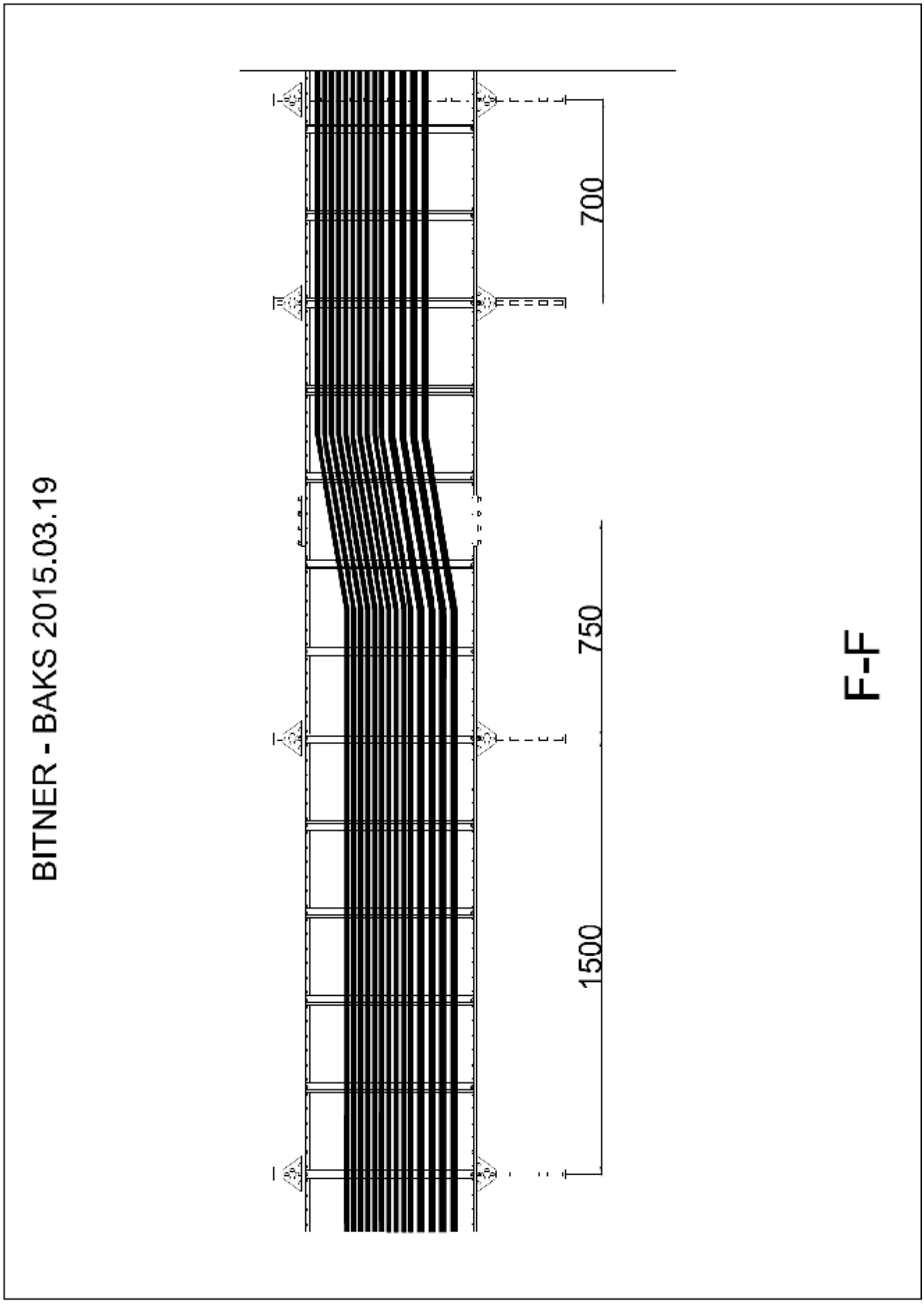
C-C

DRAWINGS




BITNER - BAKS 2015.03.19
700
750
1500
E-E

DRAWINGS



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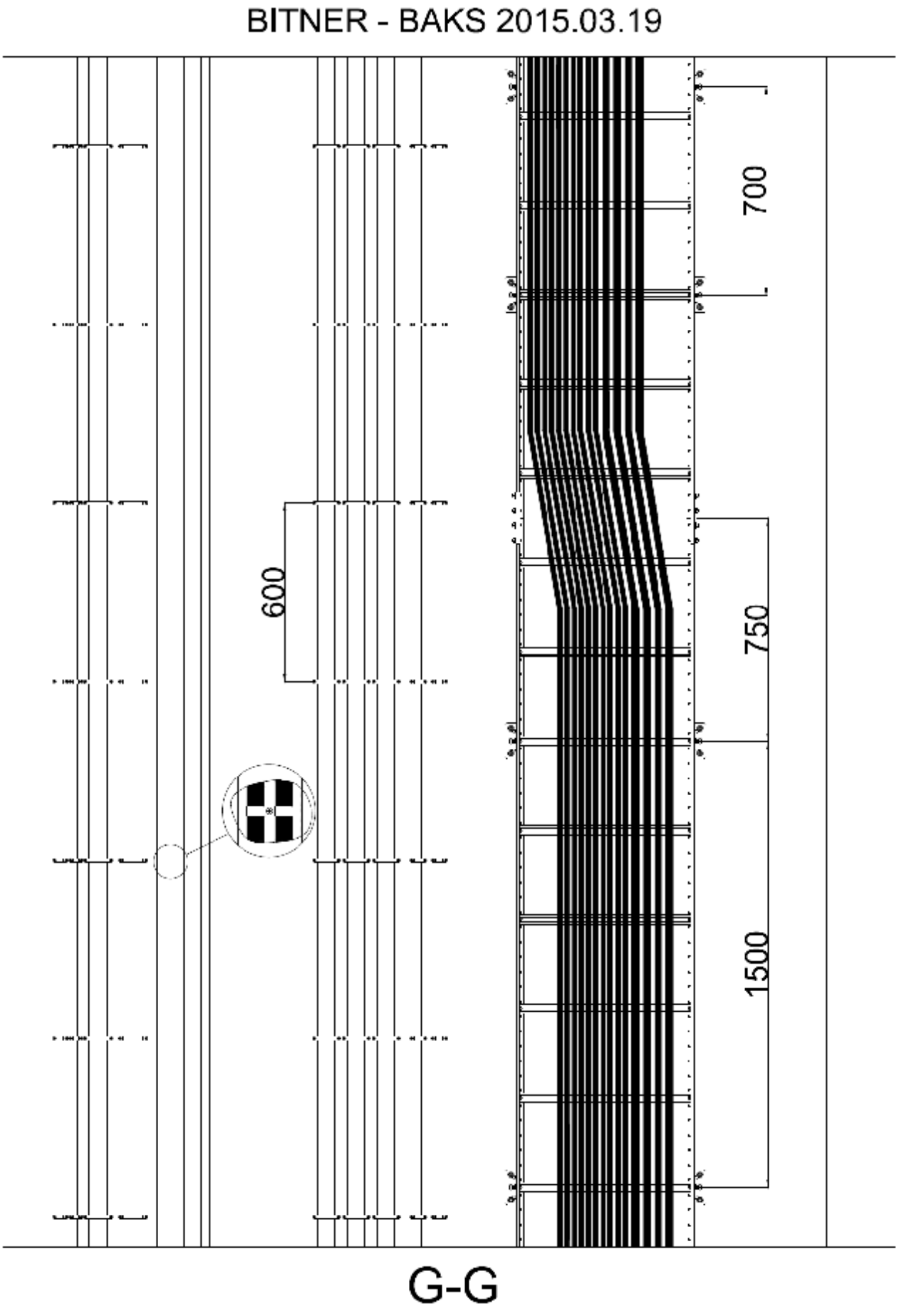

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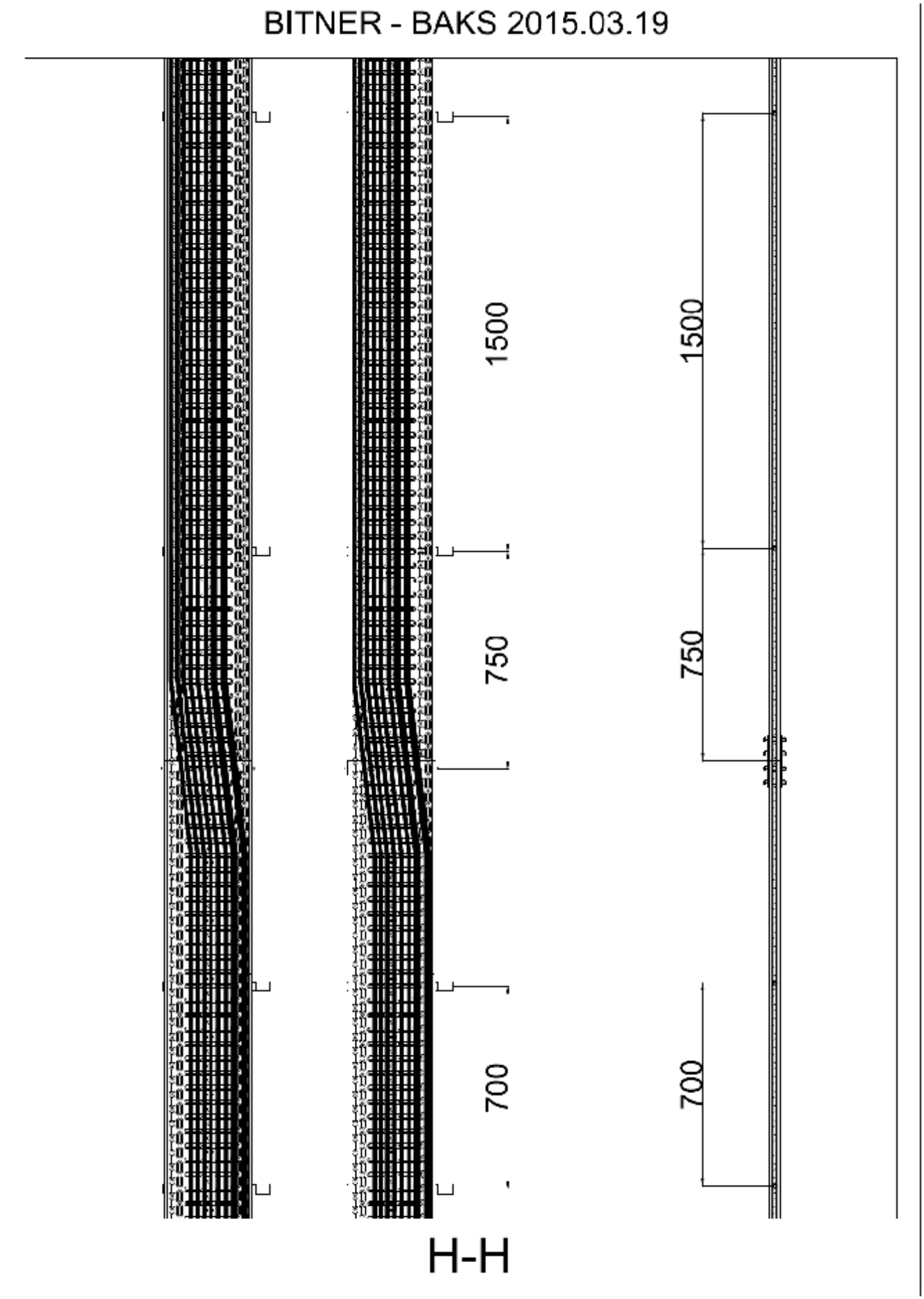
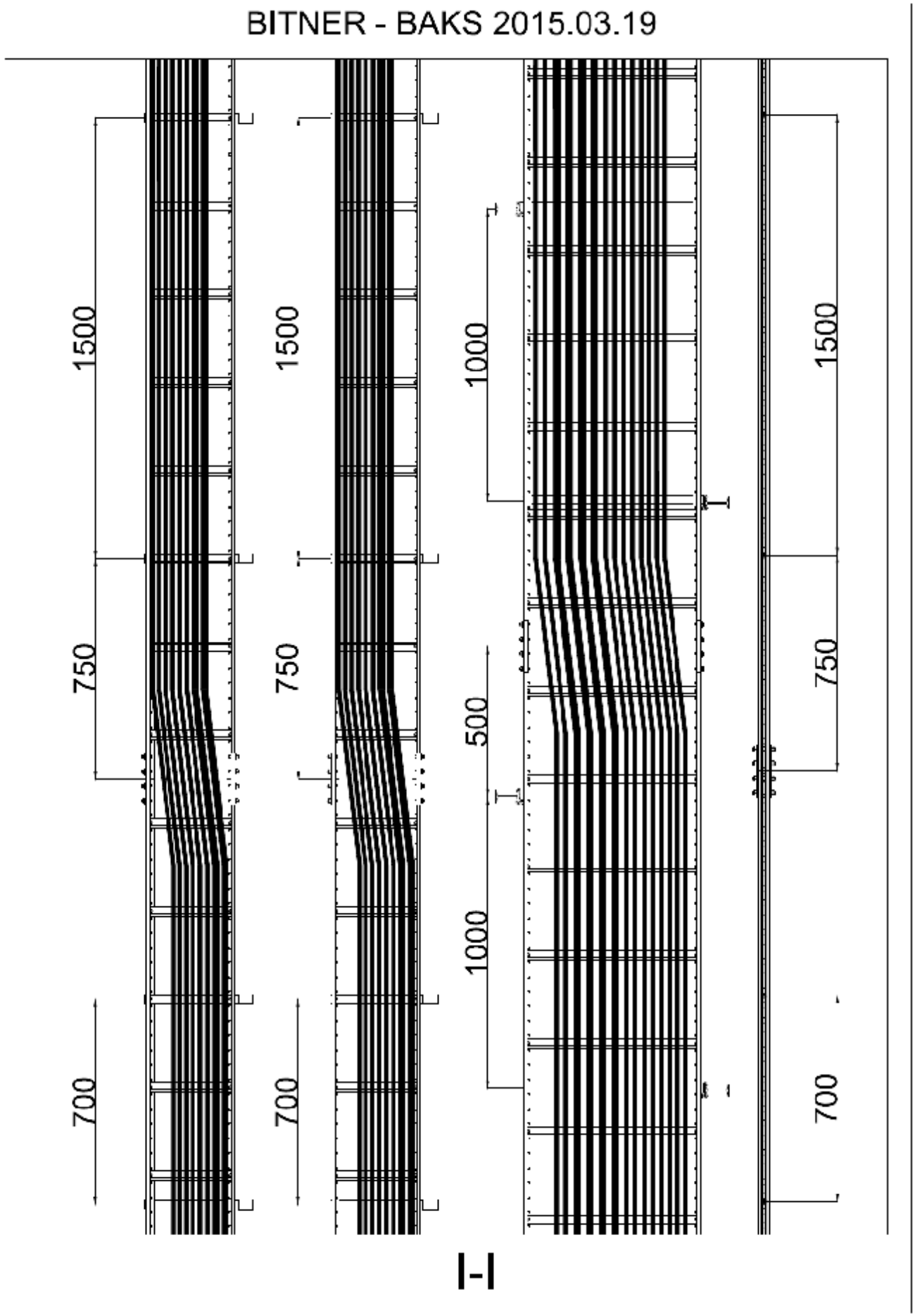
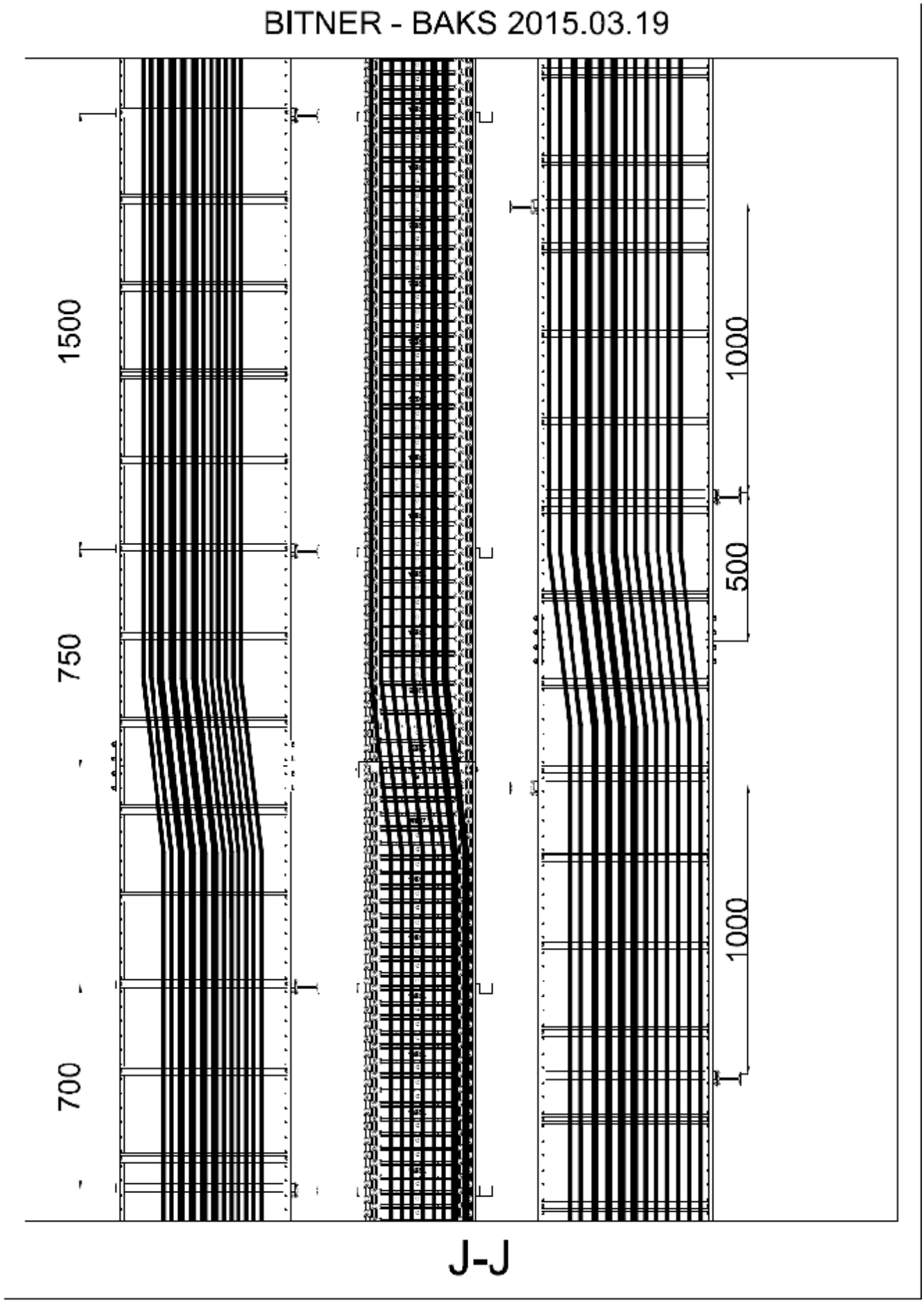


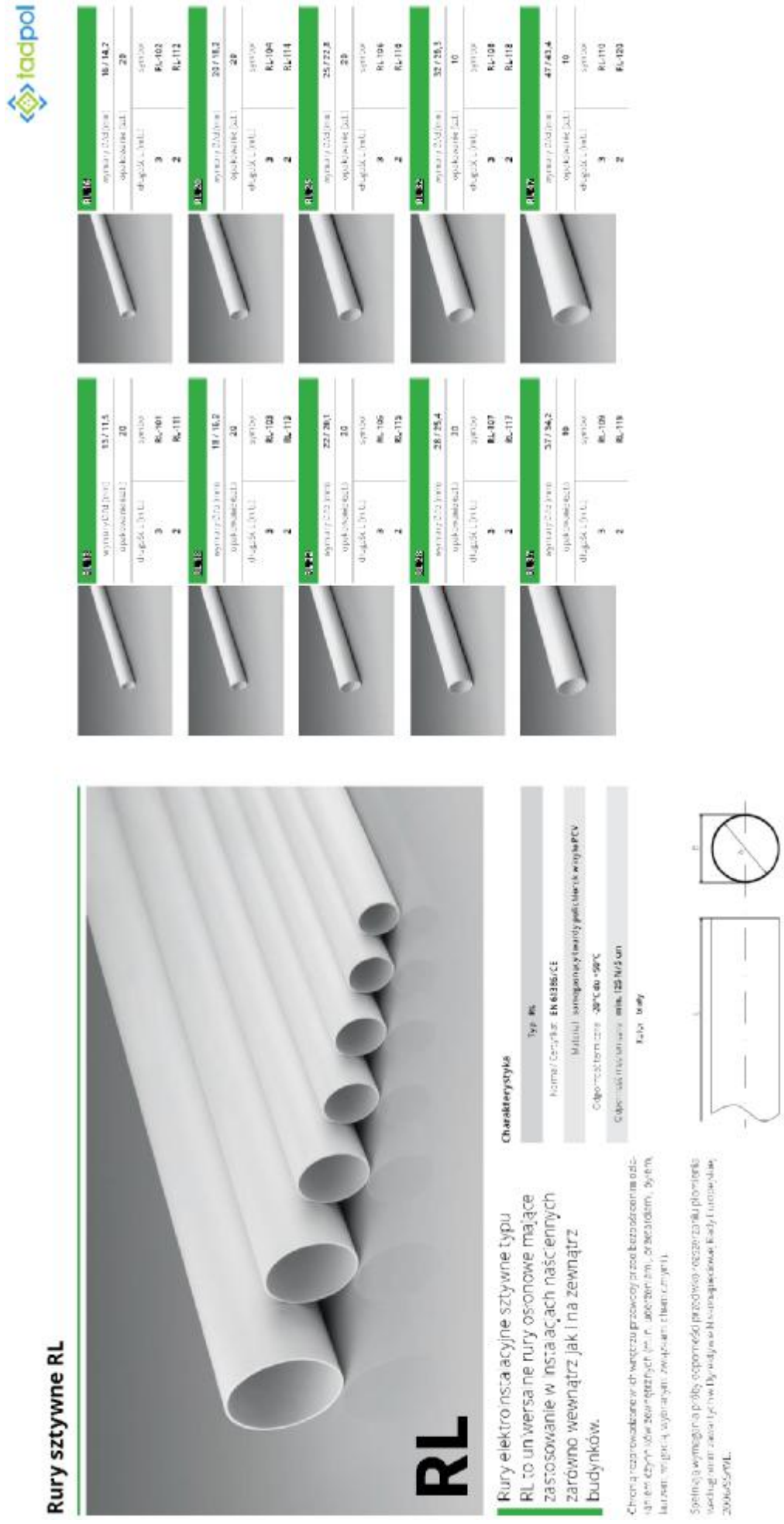
DRAWINGS


BITNER - BAKS 2015.03.19
1500
750
700
1500
750
700
1000
500
1000
1500
750
700
I-I

DRAWINGS

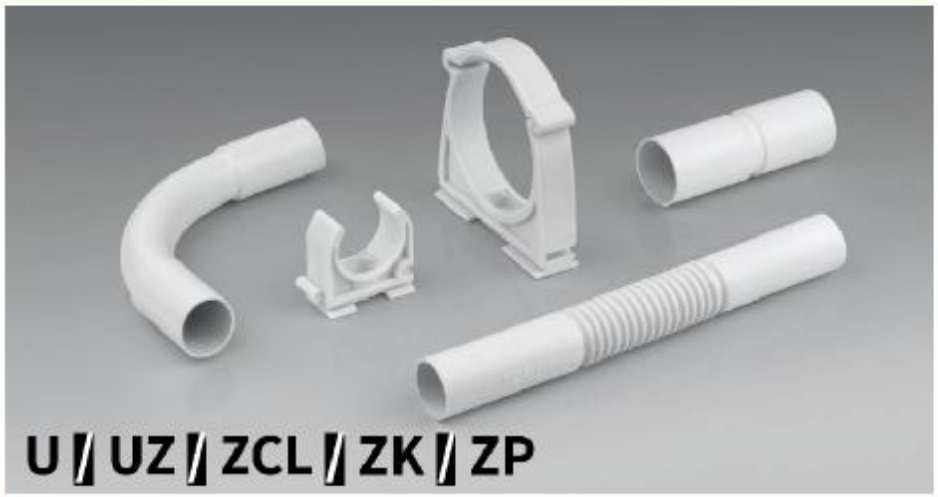


DRAWINGS


tiapol
Rury sztywne RL
RL
Rury elektroinstalacyjne sztywne typu RL to uniwersalne rury osłonowe mające zastosowanie w instalacjach naściennych zarówno wewnątrz jak i na zewnątrz budynków.
Charakterystyka
Typ RL
Norma/Certyfikat EN 61386-22
Materiał samogaśniący tworzywo polichlorek winylu PCV
Odporność termiczna -25°C do +90°C
Odporność na zgniatanie min. 125 N/5 cm
Kolor szary

tadpol

Akcesoria do rur sztywnych RL / RS



U / UZ / ZCL / ZK / ZP

Dodatkowe akcesoria do rur elektroinstalacyjnych typu RL / RS umożliwiają ich prosty montaż oraz dodatkowo z nimi tworzą system zapewniający pełną ochronę mechaniczną kabli i przewodów.

Asortyment obejmuje złącza kompensacyjne, kątowe, proste oraz uchwyty otwarte i zamykane.

Łączenie rur elektroinstalacyjnych RL/RS o tej samej średnicy umożliwiają złączki: kompensacyjne ZCL, kątowe ZK i proste ZP.
ZCL umożliwiają układanie rur pod różnymi kątami, ZK pomagają w łączeniu rur pod kątem prostym, ZP - łączenie szeregowe.

Uchwyty otwarte typu U i zamykane typu UZ przeznaczone są do montażu rur sztywnych do podłoża. Łączenia w uchwytach umożliwiają mocowanie kilkanaście rur zarówno o tej samej jak i różnej średnicy.

Charakterystyka

Typ	ZCL / ZK / ZP
Norma / Certyfikat	EN 61386/CE
Materiał	polichlorek winylu PCV
Odporność cieplna	-20°C do +60°C
Kolor	biały

Typ	U, UZ
Norma / Certyfikat	EN 61386/CE
Materiał	polipropylen modyfikowany PP
Odporność cieplna	-15°C do +90°C
Kolor	biały

U	Przeznaczenie dla RL / RS	Opakowanie (szt.)
U 16	16	100
U 18	18	100
U 20	20	100
U 22	22	100

UZ	Przeznaczenie dla RL / RS	Opakowanie (szt.)
UZ 13	13	100
UZ 16	16	100
UZ 18	18	100
UZ 20	20	100
UZ 22	22	100
UZ 25	25	100
UZ 28	28	100
UZ 32	32	100
UZ 37	37	100
UZ 47	47	100

ZCL	Przeznaczenie dla RL / RS	Opakowanie (szt.)
ZCL 13	13	100
ZCL 16	16	100
ZCL 18	18	100
ZCL 20	20	100
ZCL 22	22	100
ZCL 25	25	100
ZCL 28	28	100
ZCL 32	32	100
ZCL 37	37	50
ZCL 47	47	50

ZK	Przeznaczenie dla RL / RS	Opakowanie (szt.)
ZK 13	13	10
ZK 16	16	10
ZK 18	18	10
ZK 20	20	10
ZK 22	22	10
ZK 25	25	10
ZK 28	28	10
ZK 32	32	10
ZK 37	37	10
ZK 47	47	10
ZKD 28	28	10
ZKD 37	37	10
ZKD 47	47	10

ZP	Przeznaczenie dla RL / RS	Opakowanie (szt.)
ZP 13	13	10
ZP 16	16	10
ZP 18	18	10
ZP 20	20	10
ZP 22	22	10
ZP 25	25	10
ZP 28	28	10
ZP 32	32	10
ZP 37	37	10
ZP 47	47	10

8. 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:

Ing. Štefan Rástocký
leader of the testing laboratory

Prepared by:

Bc. Dávid Šubert
technician of the testing laboratory

9. 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