

TEST REPORT FIRES-FR-243-14-AUNE

**Cable bearing system BAKS with power and communication
cables of TECHNOKABEL S.A.**

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TEST REPORT

FIRES-FR-243-14-AUNE

Tested property: Functional resistance in fire

Test method: STN 92 0205: 2014 (ZP-27/2008, DIN 4102-12: 1998-11)
Type of test: Accredited
Date of issue: 26. 01. 2015

Name of the product: Cable bearing system BAKS with power and communication cables of TECHNOKABEL S.A.

Manufacturer: BAKS Kazimierz Sielski, ul. Jagodne 5, 05 – 480 Karczew, Poland (producer of cable bearing system)
TECHNOKABEL S.A., Nasielska 55, 04 – 343 Warszawa, 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-14-0431
Specimens received: 08. 12. 2014
Date of the test: 11. 12. 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. Mariusz Kwiatkowski	TECHNOKABEL S.A.
Mr. Pavel Stradomski	TECHNOKABEL S.A.
Mr. Michał Ulikowski	RAWLPLUG

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 71 041, F 71 042	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 TECHNOKABEL S.A. 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, assembling profiles, hangers, etc.) and power and communication halogen free cables of company TECHNOKABEL S.A..

Cables

Used cables by test:

Power cables:

NHXXH FE180 PH90/E90 1x16 RM	(3x)
NHXXH FE180 PH90/E90 1x240 RM	(3x)
NHXXH-J FE180 PH90/E90 4x1,5 RE	(10x)
NHXXH-J FE180 PH90/E90 4x6 RE	(2x)
NHXXH-J FE180 PH90/E90 4x50 RM	(8x)
NHXXH-J FE180 PH90/E90 4x1,5 RE	(2x)
NHXXH-J FE180 PH90/E90 4x50 RM	(2x)
NHXXH FE180 PH30/E30 4x1,5/1,5 RE	(2x)
NHXXH FE180 PH30/E30 4x50/25 RM	(2x)
NHXXH FE180 PH90/E90 4x1,5/1,5 RE	(2x)
NHXXH FE180 PH90/E90 4x50/25 RM	(2x)
(N)HXXH-J FE180 PH90/E90 4x1,5 RE	(30x)
(N)HXXH-J FE180 PH90/E90 4x50 RM	(30x)
(N)HXXH-J FE180 E30-E60 4x1,5 RE	(2x)
(N)HXXH-J FE180 E30-E60 4x50 RM	(2x)

Communication cables:

HTKSH PH90 1x2x0,8 mm	(20x)
JE-H(St)H FE180 PH90/E30-E90 1x2x0,8	(4x)
HDGs FE180 PH90/E30-E90 2x1 mm ²	(14x)
HDGs FE180 PH90/E30-E90 3x1,5 mm ²	(6x)
HDGs FE180 PH90/E30-E90 3x2,5 mm ²	(4x)
HDGs FE180 PH90/E30-E90 5x6 mm ²	(2x)

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:

Wall track No. 1

Track is made of steel I – beams (DPH) fixed to wall by fastening clamps (NKH) and screws with fasteners (R-FF1-N-10K120 – RAWLPLUG) in spacing of 1500 mm. Clamps are fixed to beams by nut bolt (SG M12x30). Brackets (WWCH600) are fixed to steel beams. Holders (UPWK/UPWKO) are fixed at the end of brackets with nut bolts (SGK M8x14). Brackets are fixed through these holders by threaded rods (PG M10) with washer and nuts (M10) to steel beams by hangers WKPO and bracket adapters (OD).

Cable ladders (DUP600H60, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and nut bolts (SGK M8x14) and loaded with 20kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Wall track No. 2

Track is made of steel I – beams (DPH) fixed to wall by fastening clamps (NKH) and screws with fasteners (R-FF1-N-10K120 – RAWLPLUG) in spacing of 1200 mm. Clamps are fixed to beams by nut bolt (SG M12x30). Brackets (WWCH600) are fixed to steel beams.

Cable ladders (DUP600H60, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and nut bolts (SGK M8x14) and loaded with 20kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Suspension tracks No. 3 and 4

Tracks are made of four consoles (WPCB800) fixed to ceiling by throughbolt anchors (R-HPTII-ZF-10095/15 – RAWLPLUG) in spacing of 1500 mm. Brackets (WWS/WSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR50).

Cable mesh trays (KDS/KDSO300H60, steel wire $\varnothing$ 4,5 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 mesh trays by cable clamps (UKZ1/UKZO1 – according to cable cross-section).

Suspension tracks No. 5, 6 and 7

Tracks are made of four consoles (WPCB1000) fixed to ceiling by throughbolt anchors (R-HPTII-ZF-10095/15 – RAWLPLUG) in spacing of 1500 mm. Brackets (WWS/WSO400) are fixed to consoles by screws (SM M10x20). 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 internally threaded wedge anchors (R-DCA-10-40 – RAWLPLUG).

Track No. 5:

Cable trays (KGJ/KGOJ400H60, steel sheet thickness 0,9 mm) fixed together by nut bolts (SGK M6x12). Trays are fixed to brackets by nut bolts (SGK M6x12) and loaded with 20kg.m^{-1} . Cables are fixed to trays by plastic stripes.

Track No. 6:

Cable mesh trays (KDS/KDSO400H60, steel wire $\varnothing$ 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 mesh trays by cable clamps (UKZ1/UKZO1 – according to cable cross-section).

Track No. 7:

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and nut bolts (SGK M8x14) and loaded with 25kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

**Suspension tracks No. 8 and 9**

Tracks are made of threaded rods (PG M6) fixed to ceiling by internally threaded wedge anchors (R-DCA-06-25 – RAWLPLUG) in spacing of 1500 mm. Cable trays are fixed to threaded rods by center hangers (ZSW) and nuts (NS M6) with washers (PW6).

Cable trays (KGL/KGOL50H60 – track no. 8; KGL/KGOL100H60 – track no. 9) are fixed together by nut bolts (SGK M6x12) and loaded with 5kg.m^{-1} .

Suspension tracks No. 10, 11 and 12

Tracks are made of four consoles combined of assembling profile (CWP40H22/05; length of profile 500 mm) and two threaded rods (PG M10) fixed to ceiling by internally threaded wedge anchors (R-DCA-10-40 – RAWLPLUG) in spacing of 1500 mm.

Track No. 10:

Cable trays (KBJ400H60, steel sheet thickness 0,9 mm) fixed together by nut bolts (SGK M6x12) and covered by cover (PKJ400) with clips (ZPD H60). Trays are fixed to assembling profiles by screws (SGK M6x12) and loaded with 20kg.m^{-1} . Cables are not fixed to trays.

Track No. 11:

Cable mesh trays (KDS/KDSO400H60, steel wire $\varnothing$ 4,5 mm) fixed together by junctions (USS/USSO). Mesh trays are fixed to assembling profiles by junctions (ZS/ZSO) and loaded with 20kg.m^{-1} . Cables are fixed to mesh trays by cable clamps (UKZ1/UKZO1 – according to cable cross-section).

Track No. 12:

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14) on sides. Ladders are fixed to assembling profiles by junctions (ZM/ZMO) and nut bolts (SGK M8x14) and loaded with 25kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Suspension track No. 13

Track is made of cable clips (KSA) fixed to steel beams on ceiling by beam clips (ZSU3 13/3) in spacing of 600 mm.

Suspension track No. 14

Track is made of cable clips (KSA) fixed to steel beams on ceiling by beam clamps (ZK8) together with threaded rods (PG M6) in spacing of 600 mm.

Suspension track No. 15

Track is made of cable hangers (OZO) fixed to steel beams on ceiling by beam clamps (ZK8) together with threaded rods (PG M6) in spacing of 600 mm.

Suspension track No. 15a

Track is made of cable hangers (OZSO) fixed to steel beams on ceiling by beam clamps (ZK8) together with threaded rods (PG M6) in spacing of 600 mm.

Suspension track No. 16

Track is made of assembling profiles (CWP/CWOP40H40) fixed to ceiling by threaded rods (PG M8) with nuts (NS M8) and washers (PW8) in spacing of 1500 mm. Threaded rods are fixed to ceiling by internally threaded wedge anchors (R-DCA-08-30 – RAWLPLUG).

Suspension track No. 17

Track is made of holders (WC50) fixed to ceiling by expanding anchor bolts (R-RBP-M6 – RAWLPLUG) in spacing of 1500 mm.

Cable trays (KGL/KGOL50H60, steel sheet thickness 0,7 mm) are fixed together by nut bolts (SGK M6x12) and loaded with 5kg.m^{-1} . Trays are fixed to holders by nut bolts (SGK M6x12).

Ceiling track No. 18

Track is made of plastic pipes ($\varnothing$ 16, $\varnothing$ 40) fixed to ceiling by cable clips (UDF) and screws (WHO-75052 – RAWLPLUG) in spacing of 600 mm.



Ceiling track No. 19

Track is made of cable clips (UDFB) fixed to ceiling by nails (R-KNC – RAWLPLUG) shot by gas actuated tool (SC 40 – RAWLPLUG) in spacing of 600 mm.

Suspension tracks No. 20 and 21

Tracks are made of four consoles combined of assembling profile (CWP40H40/07; length of profile 700 mm) and two threaded rods (PG M10) fixed to ceiling by internally threaded wedge anchors (R-DCA-08-30 – RAWLPLUG) in spacing of 1500 mm.

Track No. 20:

Cable trays (KGR300H60, steel sheet thickness 0,5 mm) are fixed together by nut bolts (SGK M6x12) and loaded with 10kg.m^{-1} . Trays are fixed to assembling profiles by nut bolts (SGK M6x12).

Track No. 21:

Cable ladders (DUD/DUOD300H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14) on sides. Ladders are fixed to assembling profiles by junctions (ZM/ZMO) and nut bolts (SGK M8x14) and loaded with 10kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

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 Rockwool. 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 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	20,0
standard deviation	1,3

Relative air humidity [%]

mean	42,7
standard deviation	1,5

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]
45,7	19,6

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 NHXCHX FE180 PH90/E90 4x50/25 RM	12	90 minutes no failure / interruption
2	2 cables NHXCHX FE180 PH90/E90 4x1,5/1,5 RE		90 minutes no failure / interruption
3	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		68 minutes
4	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		63 minutes
5	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	11	43 minutes
6	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
7	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	10	90 minutes no failure / interruption
8	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		61 minutes
9	2 cables HDGs Fe180 PH90/E30-E90 2x1 mm ² – 230V		45 minutes
10	3 cables NHXH FE180 PH90/E90 1x16 RM	1	90 minutes no failure / interruption
11	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	19	90 minutes no failure / interruption
12	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
13	2 cables NHXH-J FE180 PH90/E90 4x6 RE	9	90 minutes no failure / interruption
14	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
15	2 cables NHXCH FE180 PH30/E30 4x50/25 RM	7	71 minutes
16	2 cables NHXCH FE180 PH30/E30 4x1,5/1,5 RE		31 minutes
17	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
18	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		28 minutes
19	2 cables NHXH-J FE180 PH90/E90 4x50 RM	6	90 minutes no failure / interruption
20	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
21	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
22	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption



Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
23	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	5	90 minutes no failure / interruption
24	2 cables (N)HXH-J FE180 E30-E60 4x1,5 RE		90 minutes no failure / interruption
25	2 cables (N)HXH-J FE180 E30-E60 4x50 RM		90 minutes no failure / interruption
26	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
27	2 cables NHXH-J FE180 PH90/E90 4x50 RM	19	90 minutes no failure / interruption
28	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
29	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	21	90 minutes no failure / interruption
30	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		28 minutes
31	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	20	90 minutes no failure / interruption
32	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		29 minutes
33	2 cables NHXH-J FE180 PH90/E90 4x50 RM	4	90 minutes no failure / interruption
34	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
35	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	3	17 minutes
36	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
37	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	2	90 minutes no failure / interruption
38	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE		64 minutes
39	2 cables NHXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
40	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
41	3 cables NHXH FE180 PH90/E90 1x240 RM	1	85 minutes
42	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
43	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE		78 minutes
44	2 cables NHXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
45	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	15	90 minutes no failure / interruption
46	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE		90 minutes no failure / interruption
47	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	14	90 minutes no failure / interruption
48	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
49	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	13	90 minutes no failure / interruption
50	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM		90 minutes no failure / interruption
51	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	19	90 minutes no failure / interruption
52	2 cables HTKSH PH90 1x2x0,8 mm		90 minutes no failure / interruption
53	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²	8	90 minutes no failure / interruption
54	2 cables HTKSH PH90 1x2x0,8 mm		90 minutes no failure / interruption
55	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²	7	31 minutes
56	2 cables HTKSH PH90 1x2x0,8 mm	4	90 minutes no failure / interruption
57	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²	3	90 minutes no failure / interruption
58	2 cables HTKSH PH90 1x2x0,8 mm		41 minutes
59	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²	18	90 minutes no failure / interruption
60	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²		90 minutes no failure / interruption
61	2 cables HDGs FE180 PH90/E30-E90 5x6 mm ²	17	35 minutes
62	2 cables JE-H(St)H FE180 PH90/E30-E90 1x2x0,8		90 minutes no failure / interruption
63	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²	16	90 minutes no failure / interruption
64	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²		90 minutes no failure / interruption
65	2 cables HDGs FE180 PH90/E30-E90 3x2,5 mm ²	2	90 minutes no failure / interruption
66	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²		82 minutes
67	2 cables HTKSH PH90 1x2x0,8 mm	1	20 minutes
68	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²		90 minutes no failure / interruption
69	2 cables HTKSH PH90 1x2x0,8 mm		



Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
70	2 cables HTKSH PH90 1x2x0,8 mm	15a	90 minutes no failure / interruption
71	2 cables JE-H(St)H FE180 PH90/E30-E90 1x2x0,8		90 minutes no failure / interruption
72	2 cables HTKSH PH90 1x2x0,8 mm	15	85 minutes
73	2 cables HTKSH PH90 1x2x0,8 mm	14	90 minutes no failure / interruption
74	2 cables HDGs FE180 PH90/E30-E90 3x2,5 mm ²	13	90 minutes no failure / interruption
75	2 cables HTKSH PH90 1x2x0,8 mm		90 minutes no failure / interruption

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

Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.

Specimens S52 – S75 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V / 0,03W.

Circuit breakers with rating 3 A were used.



Measured values inside the test furnace

Time t [min]	Temperature [°C]											Deviation d _e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	21,8	22,5	21,8	22,7	22,0	24,4	23,9	23,3	22,8	20,0	19,6	0,0	17,5
5	543,3	675,1	725,4	602,0	647,9	588,7	627,2	614,6	628,0	576,0	19,7	-4,0	20,0
10	590,7	675,2	703,5	719,0	656,5	679,2	704,3	711,7	680,0	678,0	19,7	-1,3	19,3
15	739,0	785,2	787,0	683,5	770,4	764,0	748,9	716,2	749,3	739,0	19,8	-0,7	18,2
20	768,7	789,8	795,0	810,6	784,5	800,6	795,8	803,2	793,5	781,0	19,8	-0,5	18,6
25	827,5	831,8	825,7	839,1	828,3	795,1	828,9	834,0	826,3	815,0	19,9	0,0	17,2
30	843,8	867,7	867,5	842,3	859,7	839,3	854,1	848,2	852,8	842,0	19,9	0,5	17,7
35	834,4	851,1	854,7	843,9	846,7	857,3	866,0	855,0	851,1	865,0	20,0	0,1	19,2
40	854,5	867,0	872,3	868,5	864,6	869,7	874,5	871,5	867,8	885,0	20,0	-0,3	19,7
45	903,7	907,1	898,9	892,9	903,2	911,7	902,6	897,8	902,2	902,0	20,1	-0,3	18,7
50	904,3	914,5	904,0	911,4	907,6	910,4	904,3	907,9	908,0	918,0	20,1	-0,4	17,2
55	925,0	928,6	924,4	928,6	926,0	934,7	922,3	925,5	926,9	932,0	20,2	-0,4	17,1
60	936,0	937,3	934,1	943,7	935,8	944,5	929,2	936,5	937,1	945,0	20,2	-0,5	17,5
65	950,6	951,7	949,3	955,3	950,5	963,3	941,7	948,5	951,4	957,0	20,3	-0,5	19,4
70	961,4	963,3	960,2	969,1	961,6	977,0	954,1	961,6	963,5	968,0	20,4	-0,5	18,9
75	973,8	976,3	974,6	982,6	974,9	986,8	966,7	974,7	976,3	979,0	20,4	-0,5	17,3
80	985,7	986,5	984,3	998,5	985,5	1000,2	978,1	988,3	988,4	988,0	20,4	-0,5	19,2
85	995,4	998,7	998,4	1003,5	997,5	1002,4	986,2	994,9	997,1	997,0	20,5	-0,4	18,6
90	1001,3	1006,5	1006,2	1013,0	1004,7	1009,8	996,6	1004,8	1005,4	1006,0	20,6	-0,4	17,2
91	1001,5	1008,6	1005,4	1013,7	1005,2	1012,2	997,3	1005,5	1006,2	1008,0	20,5	-0,4	19,8
92	1004,9	1011,0	1007,4	1014,6	1007,8	1013,3	999,2	1006,9	1008,1	1009,0	20,6	-0,4	19,0
93	1004,8	1010,3	1010,6	1015,8	1008,6	1016,9	1002,8	1009,3	1009,9	1011,0	20,6	-0,4	19,0

Tave Average temperature in the test furnace calculated from plate thermometers

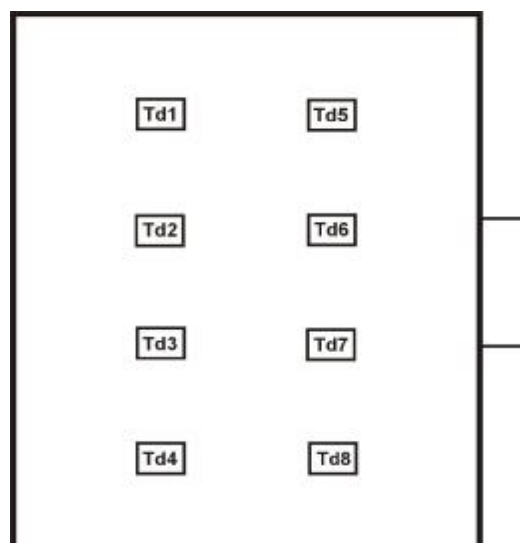
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

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

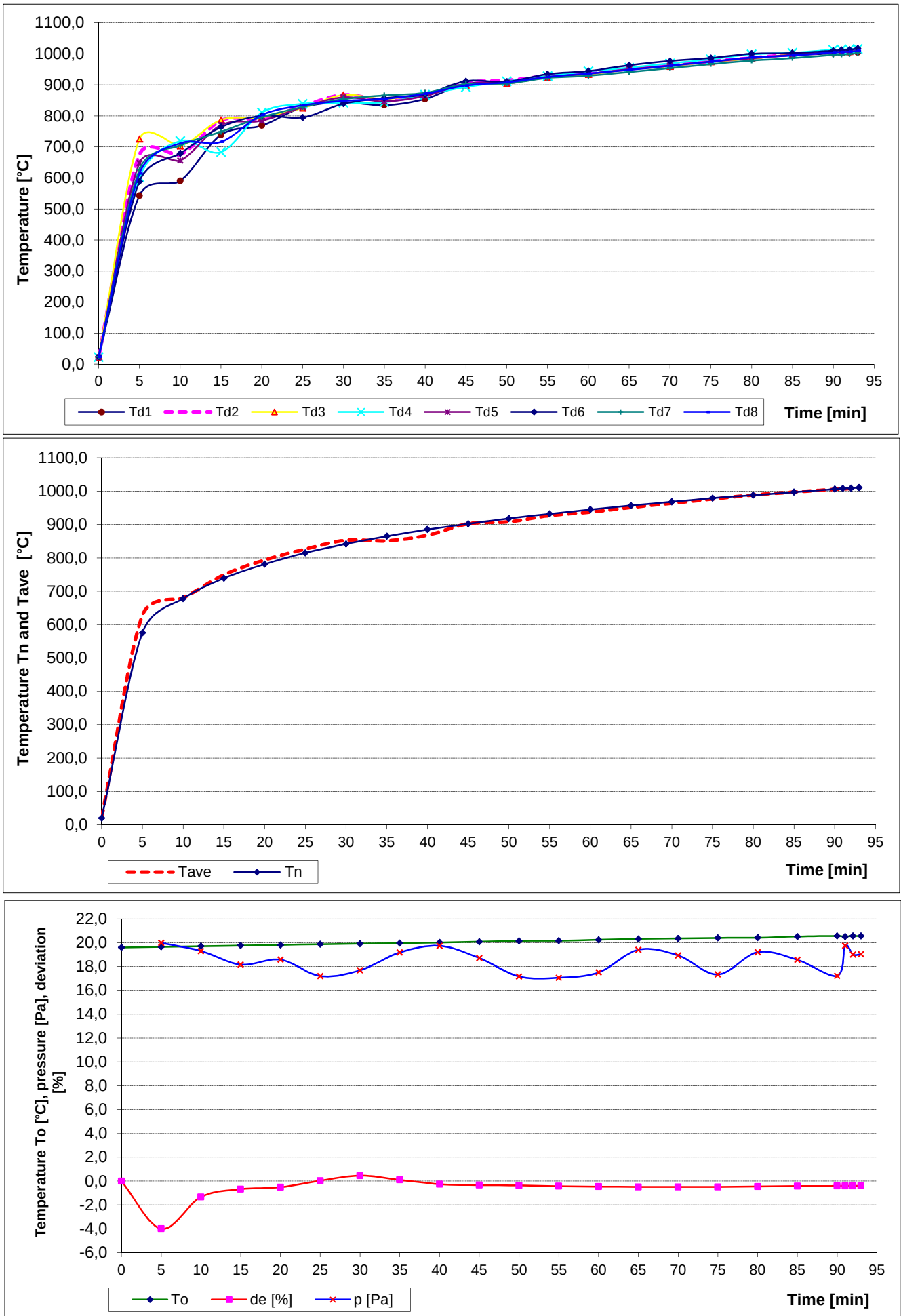
p Pressure inside the test furnace measured under the ceiling of the test furnace

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	68:50
	10-L2	x
	11-L3	68:50
	12-PEN	x
S4	13-L1	x
	14-L2	63:28
	15-L3	x
	16-PEN	x
S5	17-L1	43:42
	18-L2	x
	19-L3	x
	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	x
	30-L2	61:21
	31-L3	x
	32-PEN	x
S9	33-L1	45:08
	34-L2	-
	35-L3	-
	36-PEN	x
S10	37-L1	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption

Specimen No.	Cables
1	2 cables NHXCHX FE180 PH90/E90 4x50/25 RM
2	2 cables NHXCHX FE180 PH90/E90 4x1,5/1,5 RE
3	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
4	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
5	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
6	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
7	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
8	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
9	HDGs Fe180 PH90/E30-E90 2x1 mm ² – 230V
10	3 cables NHXH FE180 PH90/E90 1x16 RM

- 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	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S12	45-L1	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
S15	57-L1	71:46
	58-L2	71:46
	59-L3	71:46
	60-PEN	x
S16	61-L1	31:25
	62-L2	x
	63-L3	x
	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	28:53
	70-L2	x
	71-L3	x
	72-PEN	x
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 NHXH-J FE180 PH90/E90 4x1,5 RE
12	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
13	2 cables NHXH-J FE180 PH90/E90 4x6 RE
14	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
15	2 cables NHXCH FE180 PH30/E30 4x50/25 RM
16	2 cables NHXCH FE180 PH30/E30 4x1,5/1,5 RE
17	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
18	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
19	2 cables NHXHX-J FE180 PH90/E90 4x50 RM
20	2 cables NHXHX-J FE180 PH90/E90 4x1,5 RE

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable
 Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
 Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S21 to S30 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	no failure / interruption
	94-L2	no failure / interruption
	95-L3	no failure / interruption
	96-PEN	no failure / interruption
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	no failure / interruption
	106-L2	no failure / interruption
	107-L3	no failure / interruption
	108-PEN	no failure / interruption
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	x
	118-L2	x
	119-L3	28:06
	120-PEN	x

Specimen No.	Cables
21	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
22	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
23	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
24	2 cables (N)HXH-J FE180 E30-E60 4x1,5 RE
25	2 cables (N)HXH-J FE180 E30-E60 4x50 RM
26	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
27	2 cables NHXH-J FE180 PH90/E90 4x50 RM
28	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
29	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
30	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM

- 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	x
	126-L2	x
	127-L3	29:42
	128-PEN	x
S33	129-L1	no failure / interruption
	130-L2	no failure / interruption
	131-L3	no failure / interruption
	132-PEN	no failure / interruption
S34	133-L1	no failure / interruption
	134-L2	no failure / interruption
	135-L3	no failure / interruption
	136-PEN	no failure / interruption
S35	137-L1	17:59
	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	x
	150-L2	64:09
	151-L3	x
	152-PEN	x
S39	153-L1	no failure / interruption
	154-L2	no failure / interruption
	155-L3	no failure / interruption
	156-PEN	no failure / interruption
S40	157-L1	no failure / interruption
	158-L2	no failure / interruption
	159-L3	no failure / interruption
	160-PEN	no failure / interruption

Specimen No.	Cables
31	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
32	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
33	2 cables NHXH-J FE180 PH90/E90 4x50 RM
34	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
35	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
36	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
37	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
38	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
39	2 cables NHXH-J FE180 PH90/E90 4x50 RM
40	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM

- 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	85:53
	162-L2	-
	163-L3	-
	164-PEN	-
S42	165-L1	no failure / interruption
	166-L2	no failure / interruption
	167-L3	no failure / interruption
	168-PEN	no failure / interruption
S43	169-L1	x
	170-L2	78:51
	171-L3	78:51
	172-PEN	x
S44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption
S45	177-L1	no failure / interruption
	178-L2	no failure / interruption
	179-L3	no failure / interruption
	180-PEN	no failure / interruption
S46	181-L1	no failure / interruption
	182-L2	no failure / interruption
	183-L3	no failure / interruption
	184-PEN	no failure / interruption
S47	185-L1	no failure / interruption
	186-L2	no failure / interruption
	187-L3	no failure / interruption
	188-PEN	no failure / interruption
S48	189-L1	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	3 cables NHXH FE180 PH90/E90 1x240 RM
42	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
43	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
44	2 cables NHXH-J FE180 PH90/E90 4x50 RM
45	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
46	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
47	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
48	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
49	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
50	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM

- 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 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 (N)HXH-J FE180 PH90/E90 4x1,5 RE

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	31:37
	226-PEN	-
S56B	227-L	32:14
	228-PEN	-
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	41:44
	240-PEN	-
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
52	2 cables HTKSH PH90 1x2x0,8 mm
53	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
54	2 cables HTKSH PH90 1x2x0,8 mm
55	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²
56	2 cables HTKSH PH90 1x2x0,8 mm
57	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²
58	2 cables HTKSH PH90 1x2x0,8 mm
59	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
60	2 cables HDGs FE180 PH90/E30-E90 3x1,5 mm ²
61	2 cables HDGs FE180 PH90/E30-E90 5x6 mm ²

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 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	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	35:03
	260-PEN	-
S65A	261-L	no failure / interruption
	262-PEN	no failure / interruption
S65B	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66A	265-L	no failure / interruption
	266-PEN	no failure / interruption
S66B	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	87:59
	270-PEN	-
S67B	271-L	82:10
	272-PEN	-
S68A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S68B	275-L	20:12
	276-PEN	-
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
62	2 cables JE-H(St)H FE180 PH90/E30-E90 1x2x0,8
63	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
64	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
65	2 cables HDGs FE180 PH90/E30-E90 3x2,5 mm ²
66	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
67	2 cables HTKSH PH90 1x2x0,8 mm
68	2 cables HDGs FE180 PH90/E30-E90 2x1 mm ²
69	2 cables HTKSH PH90 1x2x0,8 mm
70	2 cables HTKSH PH90 1x2x0,8 mm
71	2 cables JE-H(St)H FE180 PH90/E30-E90 1x2x0,8

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	85:18
	292-PEN	-
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 PH90 1x2x0,8 mm
73	2 cables HTKSH PH90 1x2x0,8 mm
74	2 cables HDGs FE180 PH90/E30-E90 3x2,5 mm ²
75	2 cables HTKSH PH90 1x2x0,8 mm

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.

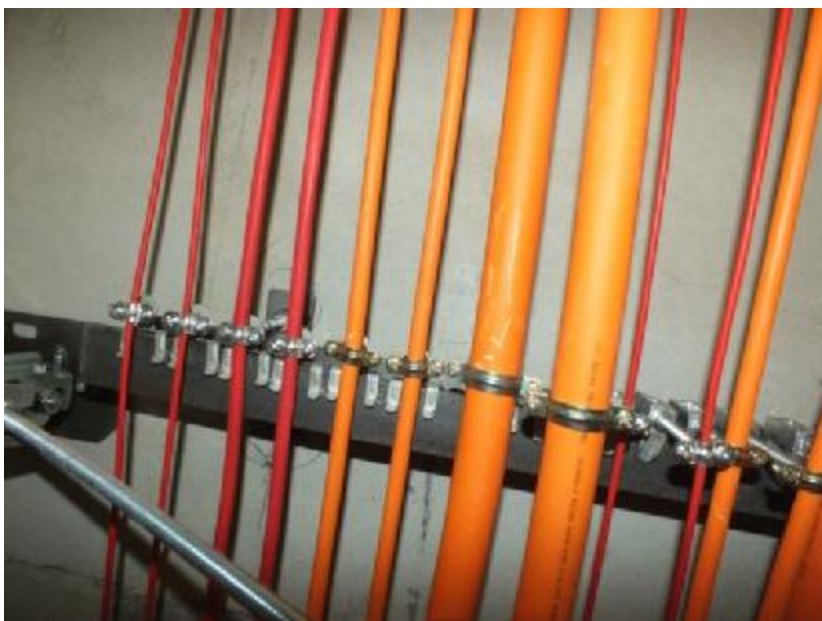


Photo taken before the test.



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

ISO
9001:2008

(N)HXH FE180 PH90/E30-E60 0.6/1 kV; (N)HXH-J FE180 PH90/E30-E60 0.6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXH FE180 PH90/E30-E60 0.6/1 kV and (N)HXH-J FE180 PH90/E30-E60 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

CABLES

ISO
9001:2008

(N)HXH FE180 PH90/E30-E60 0.6/1 kV; (N)HXH-J FE180 PH90/E30-E60 0.6/1 kV

CHARACTERISTICS

The cables maintain their functions up to 60 minutes, meeting requirements of DIN 4102-12 and PN-EN 50200 standards

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
no	mm ²
1	16 + 400
2 - 5	1 + 240
7 - 19	1; 1.5; 2.5 i 4
24 - 40	1; 1.5; 2.5

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	1 x 10 ¹¹ Ω·cm	during installation	from -5 to +50°C
Inductance, approximate	0.7 mH/km	Minimum bending radius:	single core cables -15 x cable diameter multi core cables -12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate	8.8	Cable combustibility	flame retardant
conductivity, approximate	0.4 μS/mm	Circuit integrity *	
Smoke density per PN-EN 50268-2-3, IEC 61034-2 light transmittance, minimum	94%	E30-E60 PH90	DIN 4102-12 PN-EN 50200 or PN-EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
		Reference standards	WT-TK-44 DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
1 x 16 RE	8,8	154	210	0,39
1 x 25 RM	10,8	240	315	0,42
1 x 35 RM	11,8	336	410	0,43
1 x 50 RM	13,4	480	550	0,59
1 x 70 RM	15,2	672	755	0,65
1 x 95 RM	17,3	912	1070	0,78
1 x 120 RM	18,8	1152	1260	0,88
2 x 1,5 RE	9,7	28,8	147	0,74
2 x 2,5 RE	10,5	48	181	0,82
2 x 4 RE	11,4	77	230	0,93
2 x 6 RE	12,4	116	290	1,03
2 x 10 RE	14,0	192	405	1,22
2 x 16 RE	16,0	307	575	1,37
2 x 25 RM	19,9	480	880	1,86
3 x 1,5 RE	10,2	43,2	168	0,79
3 x 2,5 RE	11,0	72	210	0,85
3 x 4 RE	12,0	116	275	0,99
3 x 6 RE	13,1	173	350	1,07
3 x 10 RE	14,8	288	500	1,26
3 x 16 RM	17,6	461	770	1,52
3 x 25 RM	21,4	720	1110	1,88
4 x 1,5 RE	11,1	58	200	0,87

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 2,5 RE	12,0	96	255	0,96
4 x 4 RE	13,1	154	335	1,06
4 x 6 RE	14,3	230	435	1,18
4 x 10 RE	16,5	384	630	1,40
4 x 16 RM	19,4	614	970	1,73
4 x 25 RM	23,6	960	1400	2,56
4 x 35 RM	26,3	1344	1840	3,03
4 x 50 RM	30,1	1920	2470	3,35
5 x 1,5 RE	12,1	72	240	0,98
5 x 2,5 RE	13,1	120	305	1,06
5 x 4 RE	14,3	192	400	1,16
5 x 6 RE	15,9	288	530	1,29
5 x 10 RE	18,0	480	765	1,57
5 x 16 RM	21,5	768	1190	1,88
5 x 25 RM	26,2	1200	1720	3,00
5 x 35 RM	29,0	1680	2250	3,24
5 x 50 RM	33,4	2400	3050	3,68
7 x 1,5 RE	13,1	101	280	1,07

RE - single wire round conductor;

RM - multiwire round conductor

Other cross-sections and conductor counts available on request.

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CABLES

ISO
9001:2008

(N)HXH FE180 PH90/E90 0.6/1 kV; (N)HXH-J FE180 PH90/E90 0.6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

(N)HXH FE180 PH90/E90 0.6/1 kV and (N)HXH-J FE180 PH90/E90 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów.

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

CABLES

ISO
9001:2008

(N)HXH FE180 PH90/E90 0.6/1 kV; (N)HXH-J FE180 PH90/E90 0.6/1 kV

CHARACTERISTICS

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	$10^{11} \Omega \cdot \text{cm}$	during installation	from -5 to +50°C
Inductance, approximate	0.7 mH/km	Minimum bending radius:	single core cables -15 x cable diameter multi core cables -12 x cable diameter
Conductor temperature limit in work conditions at short-circuit	+ 90°C + 250°C	Cable combustibility	flame retardant
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate	6.8	Circuit integrity*	
conductivity, approximate	0.4 $\mu\text{S/mm}$	E90	DIN 4102-12
Smoke density per PN-EN 61034-2, IEC 61034-2 light transmittance, minimum	94%	PH90	PN-EN 50200 or PN-EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
		Reference standards	AT-0603-0064/2010/2012, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

*Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
1 x 16 RE	8,8	154	240	0,39
1 x 25 RM	10,8	240	360	0,42
1 x 35 RM	11,8	336	470	0,43
1 x 50 RM	13,4	480	630	0,59
1 x 70 RM	15,2	672	885	0,65
1 x 95 RM	17,3	912	1260	0,78
1 x 120 RM	18,8	1152	1500	0,88
2 x 1,5 RE	9,7	28,8	142	0,74
2 x 2,5 RE	10,5	48	175	0,82
2 x 4 RE	11,4	77	225	0,93
2 x 6 RE	12,4	115	280	1,03
2 x 10 RE	14,0	192	395	1,22
2 x 16 RE	16,0	307	555	1,37
2 x 25 RM	19,9	480	850	1,86
3 x 1,5 RE	10,2	43,2	168	0,79
3 x 2,5 RE	11,0	72	210	0,85
3 x 4 RE	12,0	115	275	0,99
3 x 6 RE	13,1	173	350	1,07
3 x 10 RE	14,8	288	500	1,26
3 x 16 RM	17,6	461	770	1,52
3 x 25 RM	21,4	720	1110	1,88
4 x 1,5 RE	11,1	58	200	0,87

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 2,5 RE	12,0	96	255	0,96
4 x 4 RE	13,1	154	335	1,06
4 x 6 RE	14,3	230	435	1,18
4 x 10 RE	16,5	384	630	1,40
4 x 16 RM	19,4	614	970	1,73
4 x 25 RM	23,6	960	1400	2,56
4 x 35 RM	26,3	1344	1840	3,03
4 x 50 RM	30,1	1920	2470	3,35
5 x 1,5 RE	12,1	72	240	0,98
5 x 2,5 RE	13,1	120	305	1,06
5 x 4 RE	14,3	192	400	1,16
5 x 6 RE	15,9	288	530	1,29
5 x 10 RE	18,0	480	765	1,57
5 x 16 RM	21,5	768	1190	1,88
5 x 25 RM	26,2	1200	1720	3,00
5 x 35 RM	29,0	1680	2250	3,24
5 x 50 RM	33,4	2400	3050	3,68
7 x 1,5 RE	13,1	101	280	1,07

Other cross-sections and conductor counts available on request.

TECHNOKABEL S.A reserves the right to change specifications without prior notice.

CABLES

ISO
9001:2008

NHXX FE180 PH90/E90 0.6/1 kV, NHXX-J FE180 PH90/E90 0.6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

NHXX FE180 PH90/E90 0.6/1 kV and NHXX-J FE180 PH90/E90 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2795/2012**.

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

CABLES

ISO
9001:2008**NHXX FE180 PH90/E90 0.6/1 kV, NHXX-J FE180 PH90/E90 0.6/1 kV****CHARACTERISTICS**

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	$1 \times 10^{11} \Omega \cdot \text{cm}$	during installation	from -5 to +50°C
Inductance, approximate	0.7 mH/km	Minimum bending radius:	single core cables -15 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate	6.8	Cable combustibility	multi core cables -12 x cable diameter
conductivity, approximate	0.4 $\mu\text{S}/\text{mm}$	Circuit integrity *	flame retardant
Smoke density per PN-EN 61034-2, IEC 61034-2 light transmittance, minimum	94%	E90	DIN 4102-12
		PH90	PN-EN 50200 or PN-EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Combustibility tests	PN-EN 60332-24, IEC 60332-3-24
			PN-EN 50200 and PN-EN 50362
		Reference standards	AT-0803-0064/2010/2012, WT-TK-44
			DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
1 x 6 RE	7,3	58	103	0,30
1 x 10 RE	8,1	96	146	0,34
1 x 16 RE	9,0	154	210	0,36
1 x 25 RM	11,0	240	310	0,47
1 x 35 RM	12,0	336	405	0,49
1 x 50 RM	13,3	480	535	0,49
1 x 70 RM	15,4	672	750	0,54
1 x 95 RM	17,1	912	1040	0,56
1 x 120 RM	18,8	1152	1240	0,58
1 x 150 RM	20,7	1440	1550	0,61
1 x 185 RM	22,8	1776	1920	0,82
1 x 240 RM	25,3	2304	2480	0,97
1 x 300 RM	27,9	2880	3050	1,04
1 x 400 RM	31,2	3840	4150	1,47
2 x 1,5 RE	10,0	28,8	153	0,79
2 x 2,5 RE	10,8	48,0	187	0,88
2 x 4 RE	11,7	77,0	240	0,98
2 x 6 RE	12,7	115	295	1,11
2 x 10 RE	14,3	192	410	1,29
2 x 16 RE	16,3	307	580	1,57
2 x 25 RM	20,5	480	895	2,34
3 x 1,5 RE	10,6	43,2	173	0,86
3 x 2,5 RE	11,4	72	215	0,94
3 x 4 RE	12,4	115	280	1,04
3 x 6 RE	13,5	173	355	1,14
3 x 10 RE	15,4	288	510	1,33
3 x 16 RM	18,0	461	770	1,60
3 x 25 RM	21,8	720	1120	2,41
3 x 35 RM	24,0	1008	1440	2,80
3 x 50 RM	27,0	1440	1910	2,98
3 x 70 RM	31,3	2016	2660	4,18
3 x 95 RM	35,0	2736	3650	5,26
3 x 120 RM	38,8	3456	4400	5,66
4 x 1,0 RE	10,9	38,4	176	0,84
4 x 1,5 RE	11,5	58,0	210	0,95

Other cross-sections and conductor counts available on request.

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 2,5 RE	12,4	96,0	260	1,03
4 x 4 RE	13,5	154	340	1,14
4 x 6 RE	14,7	230	435	1,25
4 x 10 RE	16,8	384	635	1,49
4 x 16 RM	19,8	614	965	1,78
4 x 25 RM	24,1	960	1400	2,74
4 x 35 RM	26,7	1344	1830	3,05
4 x 50 RM	29,8	1920	2420	3,31
4 x 70 RM	34,6	2688	3400	4,55
4 x 95 RM	38,9	3648	4700	5,44
5 x 1,5 RE	12,5	72	245	1,06
5 x 2,5 RE	13,5	120	310	1,33
5 x 4 RE	14,8	192	410	1,27
5 x 6 RE	16,3	288	535	1,43
5 x 10 RE	18,5	480	770	1,68
5 x 16 RM	21,9	768	1190	1,95
5 x 25 RM	26,7	1200	1720	3,02
5 x 35 RM	29,4	1680	2240	3,54
5 x 50 RM	33,1	2400	2980	3,78
5 x 70 RM	38,5	3360	4200	4,92
5 x 95 RM	43,3	4560	5800	6,57
7 x 1,5 RE	13,6	101	295	1,18
7 x 2,5 RE	14,7	168	380	1,29
7 x 4,0 RE	16,3	269	515	1,45
12 x 1,5 RE	17,8	173	475	1,71
12 x 2,5 RE	19,4	288	620	1,90
14 x 1,5 RE	18,7	202	530	1,79
19 x 1,5 RE	21,0	274	685	2,20
19 x 2,5 RE	22,9	456	900	2,38
24 x 1,5 RE	24,5	346	860	2,83
24 x 2,5 RE	27,0	576	1150	3,09
30 x 1,5 RE	26,2	432	1030	3,20
30 x 2,5 RE	28,6	720	1360	3,50

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K074A07W2013

CABLES

ISO
9001:2008**NHXHX FE180 PH90/E90 0.6/1 kV, NHXHX-J FE180 PH90/E90 0.6/1 kV**

page 1 z 2

FIRE RESISTANT HALOGEN FREE POWER CABLES**APPLICATIONS**

NHXHX FE180 PH90/E90 0.6/1 kV , NHXHX-J FE180 PH90/E90 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej -PIB) at Józefów.

Sheathing is self-extinguishing and flame retardant with higher oxygen index.

The cable is oil-resistant and designed for frequent contact with petroleum products, as in petrol stations and stores, where engine fuels and lubricants are pumped or handled.

The cables are suitable for indoor and outdoor installations or for direct earth burial.

Sheathing is UV radiation resistant.

CONSTRUCTION

conductor	–	bare copper, solid or stranded, according to PN-EN 60228, EN 60228, RE - single wire round conductor; RM - multiwire round conductor
insulation	–	mica tape and halogen free cross-linked compound insulation - colours in accordance with PN-HD 308,
filler	–	filler made of halogen free compound,
inner sheath	–	inner sheath made of halogen free compound,
sheath	–	orange, cable sheath made of halogen free cross-linked compound, (oxygen index bigger than 35%).

CABLES

ISO
9001:2008

NHXHX FE180 PH90/E90 0.6/1 kV, NHXHX-J FE180 PH90/E90 0.6/1 kV

page 2 z 2

CHARACTERISTICS

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius:	single core cables -15 x cable diameter
Conductor temperature limit in work conditions at short-circuit	+ 90°C + 250°C	Cable combustibility	multi core cables -12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate	6.8	Circuit integrity *	flame retardant
conductivity, approximate	0.4 μS/mm	E90	DIN 4102-12
Smoke density per PN-EN 61034-2, IEC 61034-2 light transmittance, minimum	94%	PH90	PN-EN 50200 or PN-EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Combustibility tests	PN-EN 60332-24, IEC 60332-3-24
		Reference standards	PN-EN 50200 and PN-EN 50362
			AT-0603-0064/2010/2012, WT-TK-44
			DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
1 x 6 RE	8,5	58	122	0,30
1 x 10 RE	9,3	96	167	0,34
1 x 16 RE	10,2	154	230	0,36
1 x 25 RM	12,2	240	340	0,47
1 x 35 RM	13,2	336	440	0,49
1 x 50 RM	14,5	480	565	0,49
1 x 70 RM	16,4	672	775	0,54
1 x 95 RM	18,1	912	1030	0,56
1 x 120 RM	19,8	1152	1270	0,58
1 x 150 RM	21,5	1440	1570	0,61
1 x 185 RM	23,6	1776	1960	0,82
1 x 240 RM	26,1	2304	2520	0,97
1 x 300 RM	28,7	2880	3100	1,04
1 x 400 RM	32	3840	4170	1,47
2 x 1,5 RE	12	28,8	197	0,79
2 x 2,5 RE	12,8	48	235	0,88
2 x 4 RE	13,7	77	285	0,98
2 x 6 RE	14,7	115	350	1,11
2 x 10 RE	16,3	192	465	1,29
2 x 16 RE	18,3	307	640	1,57
2 x 25 RM	22,5	480	975	2,34
3 x 1,5 RE	12,6	43,2	225	0,86
3 x 2,5 RE	13,4	72	270	0,94
3 x 4 RE	14,4	115	335	1,04
3 x 6 RE	15,5	173	415	1,14
3 x 10 RE	17,2	288	570	1,33
3 x 16 RM	19,3	461	800	1,60
3 x 25 RM	23,8	720	1230	2,41
3 x 35 RM	26,4	1008	1600	2,80
3 x 50 RM	29,4	1440	2070	2,98
3 x 70 RM	34,3	2016	2900	4,18
3 x 95 RM	38,2	2736	3850	5,26
3 x 120 RM	42,0	3456	4750	5,66
4 x 1,5 RE	13,5	58	260	0,95

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 2,5 RE	14,4	96	315	1,03
4 x 4 RE	15,5	154	395	1,14
4 x 6 RE	16,7	230	495	1,25
4 x 10 RE	18,8	384	700	1,49
4 x 16 RM	21,2	614	990	1,78
4 x 25 RM	26,5	960	1540	2,74
4 x 35 RM	29,1	1344	1990	3,05
4 x 50 RM	32,8	1920	2620	3,31
4 x 70 RM	37,8	2688	3650	4,55
4 x 95 RM	42,1	3648	4800	5,44
5 x 1,5 RE	14,5	72	295	1,05
5 x 2,5 RE	15,5	120	360	1,33
5 x 4 RE	16,8	192	460	1,27
5 x 6 RE	18,3	288	590	1,43
5 x 10 RE	20,7	480	835	1,68
5 x 16 RM	23,1	768	1180	1,95
5 x 25 RM	29,1	1200	1840	3,02
5 x 35 RM	32,4	1680	2430	3,54
5 x 50 RM	36,1	2400	3200	3,78
5 x 70 RM	41,7	3360	4400	4,92
5 x 95 RM	47,7	4560	5950	6,57
7 x 1,5 RE	15,6	101	350	1,18
7 x 2,5 RE	16,7	168	440	1,29
7 x 4,0 RE	18,3	269	580	1,45
12 x 1,5 RE	19,8	173	535	1,71
12 x 2,5 RE	21,6	288	690	1,90
14 x 1,5 RE	20,9	202	655	1,79
19 x 1,5 RE	23,0	274	740	2,20
19 x 2,5 RE	24,9	456	960	2,38
24 x 1,5 RE	26,9	346	945	2,83
24 x 2,5 RE	29,4	576	1230	3,09
30 x 1,5 RE	28,6	432	1110	3,20
30 x 2,5 RE	31,2	720	1460	3,50

Other cross-sections and conductor counts available on request.

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CABLES

ISO
9001:2008**NHXCH FE180 PH30/E30 0.6/1 kV****FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

NHXCH FE180 PH30/E30 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów.

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

CABLES

ISO
9001:2008

NHXCH FE180 PH30/E30 0.6/1 kV

CHARACTERISTICS

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	15 x cable diameter
Conductor temperature limit in work conditions at short-circuit	+ 90°C + 250°C	Cable combustibility	flame retardant
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate conductivity, approximate	6.8 0.4 µS/mm	Circuit integrity	
Smoke density per PN-EN 61034-2, IEC 61034-2 light transmittance, minimum	94%	E30 PH30	DIN 4102-12 PN-EN 50200 or PN-EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Combustibility tests	PN-EN 60332-3-24, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
		Reference standards	AT-0603-0064/2010/2012, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
2 x 1.5 RE/1.5	13,1	52	235	0,89
2 x 2.5 RE/2,5	14,1	80	285	0,99
2 x 4 RE/ 4	15,4	123	355	1,10
2 x 6 RE/ 6	16,3	182	425	1,14
2 x 10 RE/ 10	18,6	312	595	1,37
2 x 16 RE/ 16	20,5	489	795	1,45
2 x 25 RM/ 16	24,5	661	1140	2,26
2 x 35 RM/ 16	26,5	853	1410	2,63
2 x 50 RM/ 25	29,5	1243	1820	2,73
2 x 70 RM/ 35	33,8	1737	2600	4,21
2 x 95 RM/ 50	38,8	2386	3750	5,48
2 x 120 RM/ 70	42,4	3090	4600	7,34
3 x 1,5 RE/ 1,5	13,6	66	265	0,97
3 x 2,5 RE/ 2,5	14,7	104	320	1,04
3 x 4 RE/4	16,0	161	410	1,18
3 x 6 RE/ 6	17,0	240	495	1,20
3 x 10 RE/ 10	19,4	408	710	1,46
3 x 16 RE/ 16	21,5	643	965	1,53
3 x 25 RM/ 16	25,8	902	1390	2,31
3 x 35 RM/ 16	27,8	1190	1750	2,65
3 x 50 RM/ 25	31,4	1723	2300	2,73
3 x 70 RM/ 35	36,4	2410	3250	3,96
3 x 95 RM/ 50	40,4	3296	4250	4,48
3 x 120 RM/ 70	45,1	4236	5350	5,44

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 1,5 RE/ 1,5	14,4	81	290	1,06
4 x 2,5 RE/ 2,5	15,6	128	370	1,16
4 x 4 RE/ 4	17,0	200	475	1,30
4 x 6 RE/ 6	18,2	297	580	1,33
4 x 10 RE/ 10	20,8	504	845	1,64
4 x 16 RE/ 16	23,1	796	1160	1,72
4 x 25 RM/ 16	27,8	1142	1690	2,59
4 x 35 RM/ 16	30,4	1526	2160	3,00
4 x 50 RM/ 25	34,7	2203	2880	3,20
4 x 70 RM/ 35	39,8	3082	4000	4,57
4 x 95 RM/ 50	44,3	4208	5260	4,90
4 x 120 RM/ 70	50,0	5388	6800	6,85
7 x 1,5 RE/ 2,5	16,3	133	395	1,31
7 x 2,5 RE/ 2,5	17,7	200	500	1,44
12 x 1,5 RE/ 2,5	20,4	205	600	1,84
12 x 2,5 RE/ 4	21,8	334	740	2,03
24 x 1,5 RE/ 6	26,3	413	990	2,77
24 x 2,5 RE/ 10	29,0	696	1300	3,15
30 x 1,5 RE/ 6	27,2	499	1110	3,08
30 x 2,5 RE/ 10	30,4	840	1510	3,46

Other cross-sections and conductor counts available on request.

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NHXCHX FE180 PH90/E90 0.6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

NHXCHX FE180 PH90/E90 0.6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów.

Sheathing is self-extinguishing and flame retardant with higher oxygen index.

The cable is oil-resistant and designed for frequent contact with petroleum products, as in petrol stations and stores, where engine fuels and lubricants are pumped or handled.

The cables are suitable for indoor and outdoor installations or for direct earth burial.

Sheathing is UV radiation resistant

CONSTRUCTION

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

CABLES

ISO
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NHXCHX FE180 PH90/E90 0.6/1 kV

CHARACTERISTICS

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -30 to +90°C
Insulation resistivity at 90°C, minimum	10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	15 x cable diameter
Conductor temperature limit in work conditions	+ 90°C	Cable combustibility	flame retardant
at short-circuit	+ 250°C	Circuit integrity *	
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate	6.8	E90	DIN 4102-12
conductivity, approximate	0.4 μS/mm	PH90	PN-EN 50200 or PN-EN 50362
Smoke density per PN-EN 61034-2, IEC 61034-2		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
light transmittance, minimum	94%	Combustibility tests	PN-EN 60332-3-24, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362
		Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
2 x 1,5 RE/1,5	13,7	52	255	1,01
2 x 2,5 RE/2,5	14,7	80	300	1,08
2 x 4 RE/4	16,0	123	375	1,22
2 x 6 RE/6	17,0	182	440	1,26
2 x 10 RE/10	19,2	312	620	1,54
2 x 16 RE/16	21,2	489	820	1,62
2 x 25 RM/16	25,0	661	1160	2,45
2 x 35 RM/16	27,0	853	1430	2,82
2 x 50 RM/25	30,0	1243	1840	2,92
2 x 70 RM/35	35,1	1737	2730	4,82
2 x 95 RM/50	39,5	2386	3800	5,95
2 x 120 RM/70	43,1	3090	4700	7,58
3 x 1,5 RE/1,5	14,3	66	280	1,09
3 x 2,5 RE/2,5	15,3	104	340	1,16
3 x 4 RE/4	16,7	161	425	1,29
3 x 6 RE/6	17,8	240	515	1,34
3 x 10 RE/10	20,1	408	730	1,63
3 x 16 RE/16	22,2	643	985	1,74
3 x 25 RM/16	26,4	902	1420	2,55
3 x 35 RM/16	28,7	1190	1790	2,78
3 x 50 RM/25	31,9	1723	2310	2,92
3 x 70 RM/35	37,3	2410	3300	4,43
3 x 95 RM/50	39,5	3296	4550	4,72
3 x 120 RM/70	45,8	4236	5450	5,68

Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	Fire load
mm ²	mm	kg/km	kg/km	kWh/m
4 x 1,5 RE/1,5	15,2	81	320	1,21
4 x 2,5 RE/2,5	16,4	128	390	1,28
4 x 4 RE/4	17,8	200	495	1,47
4 x 6 RE/6	19,0	297	625	1,55
4 x 10 RE/10	21,6	504	890	1,86
4 x 16 RE/16	23,9	796	1190	2,00
4 x 25 RM/16	28,8	1142	1740	2,97
4 x 35 RM/16	31,4	1526	2220	3,43
4 x 50 RM/25	35,3	2203	2920	3,53
4 x 70 RM/35	40,8	3082	4100	5,27
4 x 95 RM/50	45,9	4208	5650	5,61
4 x 120 RM/70	50,8	5388	6900	7,32
7 x 1,5 RE/2,5	17,3	133	420	1,50
7 x 2,5 RE/2,5	18,6	200	520	1,60
12 x 1,5 RE/2,5	21,4	205	640	2,13
12 x 2,5 RE/4	23,4	334	800	2,29
24 x 1,5 RE/6	28,3	413	1080	3,34
24 x 2,5 RE/10	30,9	696	1410	3,62
30 x 1,5 RE/6	29,7	499	1250	3,69
30 x 2,5 RE/10	32,7	840	1650	4,07

Other cross-sections and conductor counts available on request.

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HTKSH PH90, HTKSHekw PH90

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FIRE RESISTANT HALOGEN FREE CABLES



APPLICATIONS

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

The cables are certified by Polish Research and Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów.

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

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

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

The cables are suitable for indoor installations.

CONSTRUCTION

conductor	–	bare copper, solid,
insulation	–	mica tape and halogen free compound insulation - colours in accordance with PN-92/T-90321 standard,
pair	–	insulated conductors twisted into pairs,
cable core	–	pairs laid-up into a cable core,
separator	–	polyester tape,
shielding	–	overall electrostatic shield incorporating a plastic laminated metal foil and a tinned copper drain wire - HTKSHekw PH90 ,
sheath	–	red, cable sheath made of halogen free compound according to EN 50290-2-27 and VDE 0250-214 – HM2, (oxygen index bigger than 35%).

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HTKSH PH90, HTKSHekw PH90

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CHARACTERISTICS

Cable type		HTKSH PH90						HTKSHekw PH90					
Conductor diameter	mm	0.8	1.0	1.4	1.8	2.3	2.8	0.8	1.0	1.4	1.8	2.3	2.8
Conductor cross-section	mm ²	0.5	0.75	1.5	2.5	4	6	0.5	0.75	1.5	2.5	4	6
DC loop resistance at 20°C, maximum	Ω/km	75	48	24.5	14.9	9.3	6.3	75	48	24.5	14.9	9.3	6.3
Capacitance between conductors at 1 kHz	maximum	nF/km	120	120	120	120	120	200	200	200	200	200	200
	average		60	70	70	70	100	90	130	130	130	150	150

Operating voltage 240 V
 Voltage test 1.5 kV rms
 Insulation resistance, minimum 500 MΩ·km
 Inductance, approximate 0.7 mH/km
 Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2 pH, approximate 6.8
 conductivity, approximate 0.4 μS/mm

Smoke density per PN-EN 50268-2-3, IEC 61034-2 light transmittance, minimum 94%

Operating temperature range during operation from -30 to +80°C
 during installation from -5 to +50°C
 Minimum bending radius 10 x cable diameter
 Cable combustibility flame retardant
 Fire resistance 90 minutes at 842°C
 Combustibility tests PN-EN 60332-1-2, IEC 60332-1, PN-EN 60332-3-24, IEC 60332-3-24

Circuit integrity* E30-E90 PH90 DIN 4102-12 PN-EN 50200 or EN 50362
 Insulation integrity FE180 IEC 60331-21; IEC 60331-11
 Reference standards AT-603-0098/2006/2011 wydanie 3; WT-TK-43, PN - 92/T-90321

* Circuit integrity is dependent on installation method.

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

Symbol wyrobu	Liczba par x średnica żył	Średnica zewnętrzna (około)	Indeks miedzioży	Masa kabla (około)
	mm	mm	kg/km	kg/km
HTKSH	1 x 2 x 0.8	5.1	9.6	30
HTKSH	2 x 2 x 0.8	7.8	19.2	58
HTKSH	1 x 2 x 1.0	5.5	15.4	37
HTKSH	2 x 2 x 1.0	8.4	30.7	72
HTKSH	1 x 2 x 1.4	6.2	28.8	29
HTKSH	2 x 2 x 1.4	9.7	58	105
HTKSH	3 x 2 x 1.4	10.3	86	142
HTKSH	1 x 2 x 1.8	8.0	48	87
HTKSH	1 x 2 x 2.3	8.9	77	119
HTKSH	1 x 2 x 2.8	9.9	115	160
HTKSHekw	1 x 2 x 0.8	5.2	10.8	33
HTKSHekw	1 x 2 x 1.0	5.6	16.6	40
Symbol wyrobu		Ciepło spalania (około) kWh/m		
HTKSH PH90 1 x 2 x 0.8		0.09		
HTKSH PH90 2 x 2 x 0.8		0.17		
HTKSH PH90 1 x 2 x 1.0		0.10		
HTKSH PH90 2 x 2 x 1.0		0.19		
HTKSH PH90 1 x 2 x 1.4		0.12		
HTKSH PH90 2 x 2 x 1.4		0.22		
HTKSH PH90 3 x 2 x 1.4		0.26		

Symbol wyrobu	Liczba par x średnica żył	Średnica zewnętrzna (około)	Indeks miedzioży	Masa kabla (około)
	mm	mm	kg/km	kg/km
HTKSHekw	1 x 2 x 1.4	6.3	30	57
HTKSHekw	2 x 2 x 1.4	9.8	59	108
HTKSHekw	6 x 2 x 1.4	14.0	174	275
HTKSHekw	1 x 2 x 1.8	8.1	49.2	90
HTKSHekw	1 x 2 x 2.3	9.0	78	122
HTKSHekw	2 x 2 x 2.3	14.2	155	240
HTKSHekw	1 x 2 x 2.8	10.0	116	163

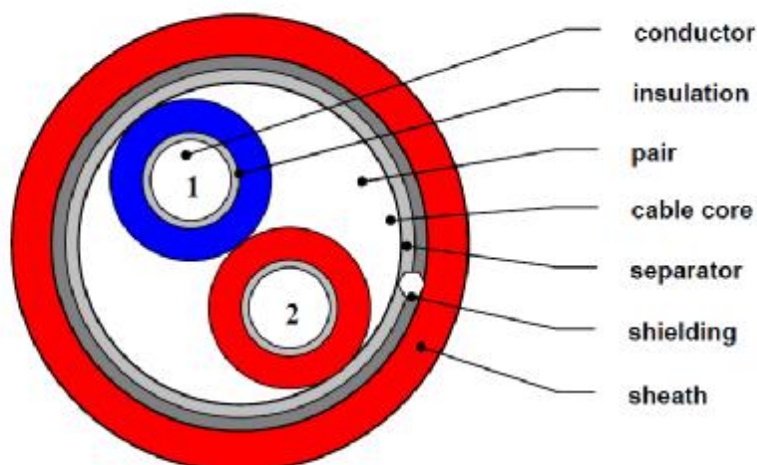
Symbol wyrobu	Ciepło spalania (około) kWh/m
HTKSH PH90 1 x 2 x 1.8	0.19
HTKSH PH90 1 x 2 x 2.3	0.22
HTKSH PH90 1 x 2 x 2.8	0.26
HTKSHekw PH90 1 x 2 x 0.8	0.09
HTKSHekw PH90 1 x 2 x 1.0	0.10
HTKSHekw PH90 1 x 2 x 1.4	0.12
HTKSHekw PH90 1 x 2 x 1.8	0.20

Other diameters and conductor counts available on request.
 TECHNOKABEL S.A reserves the right to change specifications without prior notice.

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JE-H(St)H...Bd FE180 PH90/E30-E90

FIRE RESISTANT HALOGEN FREE CABLES



APPLICATIONS

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

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

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

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

The cables are suitable for indoor installations.

CONSTRUCTION

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

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JE-H(St)H...Bd FE180 PH90/E30-E90

CHARACTERISTICS

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

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

Operating voltage	240 V	Operating temperature range	
Voltage test	1.5 kV rms	during operation	from - 30 to + 80°C
Insulation resistance, minimum	500 MΩ·km	during installation	from - 5 to + 50°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	10 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Combustibility tests	PN-EN 60332-1-2, IEC 60332-1, PN-EN 60332-3-22, IEC 60332-3-22 (cat.A)
conductivity, approximate	0.4 μS/mm	Circuit integrity *	
Smoke density per PN-EN 50268-2-3, IEC 61034-2		E30-E90	DIN 4102-12
light transmittance, minimum	94%	PH90	PN-EN 50200 or EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Reference standards	VDE 0815

* Circuit integrity is dependent on installation method.

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

Cable type	Number of pairs (x 2) x conductor diameter	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm	mm	kg/km	kg/km
JE-H(St)H FE180 PH90/E30-E90	1 x 2 x 0.8 Bd	6.5	15	60

Other diameters and conductor counts available on request.

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

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FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

HDGs(żo) FE180 PH90/E30-E90 300/500 V, HLGs(żo) FE180 PH90/E30-E90 300/500 V fire resistant cables and **HDGsekw(żo) FE180 PH90/E30-E90 300/500 V, HLGsekw(żo) FE180 PH90/E30-E90 300/500 V** screened fire resistant cables, are intended for power supply to fire protection equipment which is to operate in fire conditions. The cables are suitable for installation in alarm, signalling, transmission, sound warning and similar systems.

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów.

An overall electrostatic shield (**ekw**) in screened cables protects cable circuits against interference by external electric fields.

CONSTRUCTION

- bare copper, single wire (**D**) or stranded multi wire (**L**), round conductors meeting requirements of class 1 or 5 per PN-EN 60228,
- special silicone rubber insulation,
- identification colour code according to PN-HD 308 S2,
- insulated conductors laid-up in layers,
- cable core wrapped in polyester tape - in **HDGsekw** and **HLGsekw**,
- overall electrostatic shield incorporating aluminium-polyester tape and stranded annealed tinned copper drain wire - in **HDGsekw** and **HLGsekw**,
- red cable sheath of halogen free compound.

CABLES

ISO
9001:2008

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

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CHARACTERISTICS

Conductor diameter	mm	1,0	1,1	1,4	1,8	2,3	2,8
Conductor cross-section	mm ²	0,75	1	1,5	2,5	4	6
DC conductor resistance at 20°C, maximum	Ω/km	26,0	19,5	13,3	7,98	4,95	3,30
Capacitance between conductors at 1 kHz, – maximum	nF/km	120	120	120	120	120	120
– average		70	70	80	80	100	100

Operating voltage U_0/U	300/500 V	Corrosivity of emitted gases	very low, halogen free PN-EN 50267-2-3, IEC 60754-2
Voltage test	2 kVrms	pH, aprox. conductivity, aprox.	6,8 0,4 µS/cm
Insulation resistivity at 20°C, minimum	500 MΩ·km	Smoke density per	low smoke density PN-EN 50268-2-3, IEC 61034-2
Inductance, approximate	0,7 mH/km	light transmittance, minimum	94 %
Conductor temperature limit in work conditions	+ 85°C	Cable combustibility	flame retardant
in short-circuit (max 5 s)	+ 250°C	Combustibility tests	PN-EN 60332-1-2, IEC 60332-1, PN-EN 60332-3-22, IEC 60332-3-22 (cat.A)
Operating temperature range during operation	from - 25 to + 85°C	Circuit integrity [*] E30-E90	DIN 4102-12 PN-EN 50200 or EN 50362
during installation	from - 10 to + 50°C	PH90	
Minimum bending radius		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
HDGs(ekw) cables	10 x cable diameter	Reference standards	AT-603-0248/2009/2014 and WT-TK-46
HLGs(ekw) cables	6 x cable diameter	Circuit integrity is dependent on installation method.	

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

ISO
9001:2008

HDGs FE180 PH90/E30-E90, HDGsekw FE180 PH90/E30-E90 HLGs FE180 PH90/E30-E90, HLGsekw FE180 PH90/E30-E90

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Cable type	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm ²	mm	kg/km	kg/km
HDGs	2 x 0,75	6,4	14,4	50
HDGs	2 x 1	6,6	19,2	55
HDGs	2 x 1,5	7,5	28,8	75
HDGs	2 x 2,5	8,9	48	105
HDGs	2 x 4	9,8	77	140
HDGs	2 x 6	11,8	115	196
HDGs	3 x 0,75	6,5	21,6	52
HDGs	3 x 1	6,8	28,8	66
HDGs	3 x 1,5	8,2	43,2	95
HDGs	3 x 2,5	9,4	72	137
HDGs	3 x 4	10,6	115	191
HDGs	3 x 6	12,5	173	275
HDGs	4 x 0,75	7,3	28,8	67
HDGs	4 x 1	7,6	38,4	88
HDGs	4 x 1,5	8,9	58	122
HDGs	4 x 2,5	10,4	96	180
HDGs	4 x 4	11,6	154	235
HDGs	4 x 6	13,6	230	340
HDGs	5 x 0,75	8,1	36	86
HDGs	5 x 1	8,4	48	121
HDGs	5 x 1,5	9,7	72	151
HDGs	5 x 2,5	11,4	120	220

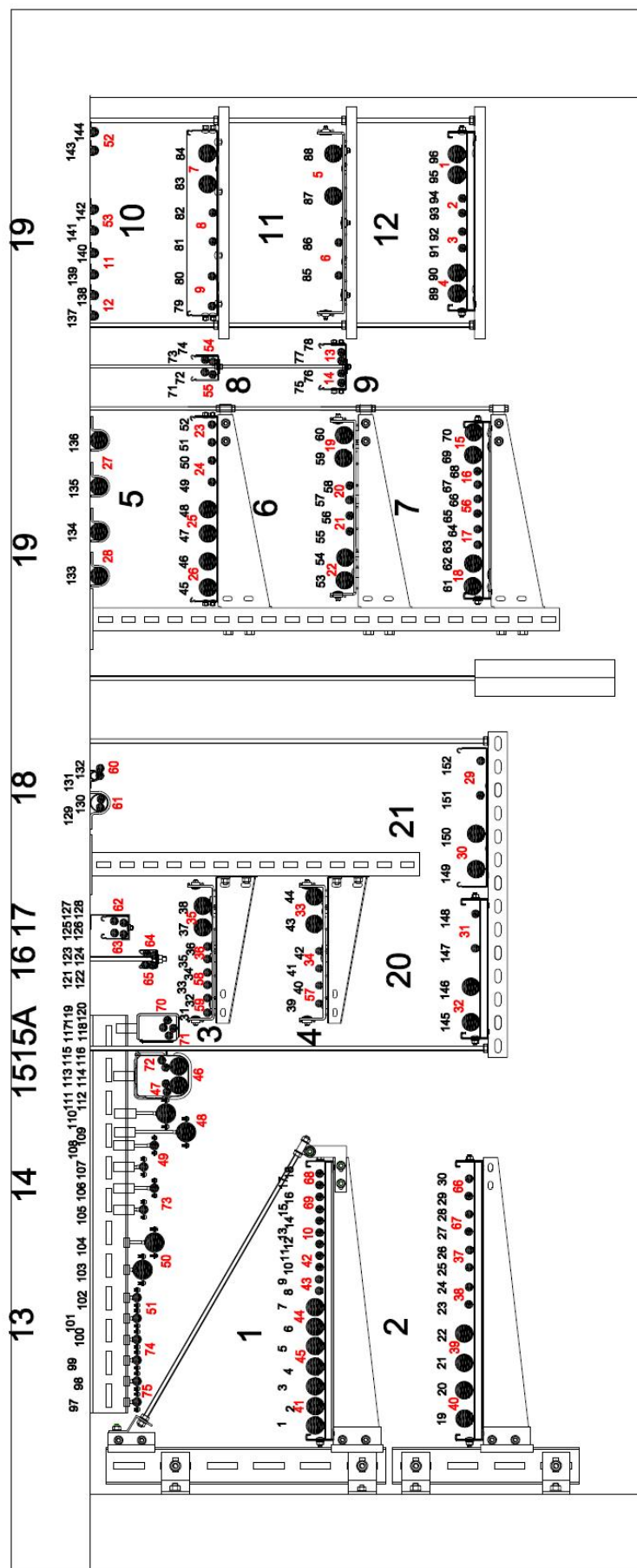
Cable type	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm ²	mm	kg/km	kg/km
HDGs	5 x 4	12,7	192	305
HDGs	5 x 6	14,9	288	420
HDGs	7 x 1,5	10,7	101	190
HDGs	7 x 2,5	12,4	168	285
HLGs	2 x 1	6,8	19,2	55
HLGs	2 x 1,5	8,0	28,8	75
HLGs	2 x 2,5	9,4	48	110
HLGs	3 x 1	7,2	28,8	72
HLGs	3 x 1,5	8,5	43,2	99
HLGs	3 x 2,5	9,9	72	149
HDGs	4 x 1	8,0	38,4	94
HDGs	4 x 1,5	9,4	58	130
HDGsekw	2 x 1	6,6	26,4	59
HDGsekw	2 x 1,5	7,7	36,0	77
HDGsekw	2 x 2,5	9,1	55,0	114
HDGsekw	3 x 1,5	8,1	50,0	101
HDGsekw	3 x 2,5	9,6	79,0	149
HLGsekw	2 x 1	7,0	19,2	73
HLGsekw	2 x 1,5	8,0	36	81
HLGsekw	2 x 4	10,5	86	148

Other cross-sections and conductor counts available on request.

TECHNOKABEL S.A reserves the right to change specifications without prior notice.



Technokabel - BAKS 2014.12.11





DRAWINGS

No	No FIRES	Type of cable	Position	Construction fixing, spacing, loading
1	41	NHXX FE180 PH90/E90 1x240 RM	1	Drabinka kablowa DUP600H60/... B-600 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie: Dwuteownik do ściany, Wysięgnik WWCH600 , pręt gwintowany PGM10..., Odciąg z obejmy OD i wieszaka WKPO
2		NHXX FE180 PH90/E90 1x240 RM		
3		NHXX FE180 PH90/E90 1x240 RM		
4	45	(N)HXX-J FE180 PH90/E90 4x50 RM		
5		(N)HXX-J FE180 PH90/E90 4x50 RM		
6	44	NHXX-J FE180 PH90/E90 4x50 RM		
7		NHXX-J FE180 PH90/E90 4x50 RM		
8	43	NHXX-J FE180 PH90/E90 4x1.5 RE		
9		NHXX-J FE180 PH90/E90 4x1.5 RE		
10	42	(N)HXX-J FE180 PH90/E90 4x1.5 RE		
11		(N)HXX-J FE180 PH90/E90 4x1.5 RE		
12	10	NHXX FE180 PH90/E90 1x16 RM		
13		NHXX FE180 PH90/E90 1x16 RM		
14		NHXX FE180 PH90/E90 1x16 RM		
15	69	HTKSH PH90 1x2x0,8 mm		
16		HTKSH PH90 1x2x0,8 mm		
17	68	HDGs FE180 PH90/E30-E90 2x1 mm ²		
18		HDGs FE180 PH90/E30-E90 2x1 mm ²		
19	40	(N)HXX-J FE180 PH90/E90 4x50 RM	2	Drabinka DUP/DUOP 600H60/... B-600/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : Dwuteownik do ściany , Wysięgnik WWCH600 , Mocowanie do betonu: Kotwy stalowe R-FF1-N-10K120 (RAWLPLUG)
20		(N)HXX-J FE180 PH90/E90 4x50 RM		
21	39	NHXX-J FE180 PH90/E90 4x50 RM		
22		NHXX-J FE180 PH90/E90 4x50 RM		
23	38	NHXX-J FE180 PH90/E90 4x1.5 RE		
24		NHXX-J FE180 PH90/E90 4x1.5 RE		
25	37	(N)HXX-J FE180 PH90/E90 4x1.5 RE		
26		(N)HXX-J FE180 PH90/E90 4x1.5 RE		
27	67	HTKSH PH90 1x2x0,8 mm		
28		HTKSH PH90 1x2x0,8 mm		
29	66	HDGs FE180 PH90/E30-E90 2x1 mm ²		
30		HDGs FE180 PH90/E30-E90 2x1 mm ²		
31	59	HDGs FE180 PH90/E30-E90 2x1 mm ²	3	Korytko siatkowe KDS/KDSO 300H60/... B-400/ 1.5 m / 10kg/m Mocowanie : Wspornik WPCB 800, Wysięgnik WWS300. Mocowanie do betonu: Kotwy stalowe R-HPTII-ZF-10095/15 (RAWLPLUG)
32		HDGs FE180 PH90/E30-E90 2x1 mm ²		
33	58	HTKSH PH90 1x2x0,8 mm		
34		HTKSH PH90 1x2x0,8 mm		
35	36	(N)HXX-J FE180 PH90/E90 4x1.5 RE		
36		(N)HXX-J FE180 PH90/E90 4x1.5 RE		
37	35	(N)HXX-J FE180 PH90/E90 4x50 RM		
38		(N)HXX-J FE180 PH90/E90 4x50 RM		
39	57	HDGs FE180 PH90/E30-E90 3x1.5 mm ²	4	Korytko siatkowe KDS/KDSO 300H60/... B-400/ 1.5 m / 10kg/m Mocowanie : Wspornik WPCB 800, Wysięgnik WWS300 Mocowanie do betonu: Kotwy stalowe R-HPTII-ZF-10095/15 (RAWLPLUG)
40		HDGs FE180 PH90/E30-E90 3x1.5 mm ²		
41	34	NHXX-J FE180 PH90/E90 4x1.5 RE		
42		NHXX-J FE180 PH90/E90 4x1.5 RE		
43	33	NHXX-J FE180 PH90/E90 4x50 RM		
44		NHXX-J FE180 PH90/E90 4x50 RM		



DRAWINGS

No	No FIRES	Type of cable	Position	Construction fixing, spacing, loading
45	26	(N)HXH-J FE180 PH90/E90 4x50 RM	5	Korytko kablowe KGJ/KGOJ 400H60/... B-400 1.5 m /20kg/m / grubość blachy 0,9 mm Mocowanie : Wspornik WPCB 1000, Wysięgnik WWS400 , pręt gwintowany PGM10..., Mocowanie do betonu: Kotwy stalowe R-HPTII-ZF-10095/15 + tuleja stalowa R-DCA-10-40 (RAWLPLUG)
46		(N)HXH-J FE180 PH90/E90 4x50 RM		
47	25	(N)HXH-J FE180 E30-E60 4x50 RM		
48		(N)HXH-J FE180 E30-E60 4x50 RM		
49	24	(N)HXH-J FE180 E30-E60 4x1.5 RE		
50		(N)HXH-J FE180 E30-E60 4x1.5 RE		
51	23	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
52		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
53	22	(N)HXH-J FE180 PH90/E90 4x50 RM	6	Korytko siatkowe KDS/KDSO 400H60/... B-400/ 1.5 m / 20kg/m Mocowanie : Wspornik WPCB 1000, Wysięgnik WWS400 , pręt gwintowany PGM10..., Mocowanie do betonu: Kotwy stalowe R-HPTII-ZF-10095/15 + tuleja stalowa R-DCA-10-40 (RAWLPLUG)
54		(N)HXH-J FE180 PH90/E90 4x50 RM		
55	21	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
56		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
57	20	NHXHX-J FE180 PH90/E90 4x1.5 RE		
58		NHXHX-J FE180 PH90/E90 4x1.5 RE		
59	19	NHXHX-J FE180 PH90/E90 4x50 RM		
60		NHXHX-J FE180 PH90/E90 4x50 RM		
61	18	(N)HXH-J FE180 PH90/E90 4x50 RM	7	Drabinka DUD/DUOD 400H 60/...B-400/ 1.5 m / 25kg/m / grubość blachy 1,2 mm Mocowanie : Wspornik WPCB 1000, Wysięgnik WWS400 , pręt gwintowany PGM10..., Mocowanie do betonu: Kotwy stalowe R-HPTII-ZF-10095/15 + tuleja stalowa R-DCA-10-40 (RAWLPLUG)
62		(N)HXH-J FE180 PH90/E90 4x50 RM		
63	17	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
64		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
65	56	HTKSH PH90 1x2x0,8 mm		
66		HTKSH PH90 1x2x0,8 mm		
67	16	NHXCH FE180 PH30/E30 4x1.5/1.5 RE		
68		NHXCH FE180 PH30/E30 4x1.5/1.5 RE		
69	15	NHXCH FE180 PH30/E30 4x50/25 RM		
70		NHXCH FE180 PH30/E30 4x50/25 RM		
71	55	HDGs FE180 PH90/E30-E90 3x1.5 mm ²	8	Korytko kablowe KGL/KGOL 50H60/... B-50 1.5 m /5kg/m / grubość blachy 0,7 mm Mocowanie: Zacisk ZSW , pręt gwintowany PG M6 Mocowanie do betonu: Tuleja stalowa R-DCA-06-25 (RAWLPLUG)
72		HDGs FE180 PH90/E30-E90 3x1.5 mm ²		
73	54	HTKSH PH90 1x2x0,8 mm		
74		HTKSH PH90 1x2x0,8 mm		
75	14	NHXH-J FE180 PH90/E90 4x1.5 RE	9	Korytko kablowe KGL/KGOL 100H60/... B-100 1.5 m /5kg/m / grubość blachy 0,7 mm Mocowanie: Zacisk ZSW , pręt gwintowany PG M6. Mocowanie do betonu: Tuleja stalowa R-DCA-06-25 (RAWLPLUG)
76		NHXH-J FE180 PH90/E90 4x1.5 RE		
77	13	NHXH-J FE180 PH90/E90 4x6 RE		
78		NHXH-J FE180 PH90/E90 4x6 RE		
79	9	HDGs FE180 PH90/E30-E90 2x1 mm ² - 230 V	10	Korytko kablowe KBJ/KBOJ 400H60/...+pokrywa B-400 1.5 m /20kg/m / grubość blachy 0,9 mm Mocowanie : Ceownik CWP/CWOP40H22/05, pręt gwintowany PGM10/... . Mocowanie do betonu: Tuleja stalowa R-DCA-10-40 (RAWLPLUG)
80		HDGs FE180 PH90/E30-E90 2x1 mm ² - 230 V		
81	8	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
82		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
83	7	(N)HXH-J FE180 PH90/E90 4x50 RM		
84		(N)HXH-J FE180 PH90/E90 4x50 RM		
85	6	(N)HXH-J FE180 PH90/E90 4x1.5 RE	11	Korytko siatkowe KDS/KDSO 400H60/... B-400/ 1.5 m / 20kg/m Mocowanie : Ceownik CWP/CWOP40H22/05, pręt gwintowany PGM10/... . Mocowanie do betonu: Tuleja stalowa R-DCA-10-40 (RAWLPLUG)
86		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
87	5	(N)HXH-J FE180 PH90/E90 4x50 RM		
88		(N)HXH-J FE180 PH90/E90 4x50 RM		



DRAWINGS

No	No FIRES	Type of cable	Position	Construction fixing, spacing, loading
89	4	(N)HXH-J FE180 PH90/E90 4x50 RM	12	Drabinka DUD/DUOD 400H 60/... B-400/1.5 m / 25kg/m / grubość blachy 1,2 mm Mocowanie: Ceownik CWP/CWOP40H22/05, pręt gwintowany PG M10/... Mocowanie do betonu: Tuleja stalowa R-DCA-10-40 (RAWLPLUG)
90		(N)HXH-J FE180 PH90/E90 4x50 RM		
91	3	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
92		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
93	2	NHXCHX FE180 PH90/E90 4x1.5/1.5 RE		
94		NHXCHX FE180 PH90/E90 4x1.5/1.5 RE		
95	1	NHXCHX FE180 PH90/E90 4x50/25 RM		
96		NHXCHX FE180 PH90/E90 4x50/25 RM		
97	75	HTKSH PH90 1x2x0,8 mm	13	Obejmy KSA mocowana do dwuteownika co 600 mm za pomocą zacisku sprężystego ZSU3 13/3
98		HTKSH PH90 1x2x0,8 mm		
99	74	HDGs FE180 PH90/E30-E90 3x2.5 mm ²		
100		HDGs FE180 PH90/E30-E90 3x2.5 mm ²		
101	51	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
102		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
103	50	(N)HXH-J FE180 PH90/E90 4x50 RM		
104		(N)HXH-J FE180 PH90/E90 4x50 RM		
105	73	HTKSH PH90 1x2x0,8 mm	14	Obejmy KSA na pręcie M6 mocowanie do dwuteownika co 600 mm za pomocą zacisku ZK8
106		HTKSH PH90 1x2x0,8 mm		
107	49	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
108		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
109	48	(N)HXH-J FE180 PH90/E90 4x50 RM		
110		(N)HXH-J FE180 PH90/E90 4x50 RM		
111	47	(N)HXH-J FE180 PH90/E90 4x50 RM	15	OZO na pręcie M6 mocowanie do dwuteownika co 600 mm
112		(N)HXH-J FE180 PH90/E90 4x50 RM		
113	46	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
114		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
115	72	HTKSH PH90 1x2x0,8 mm		
116		HTKSH PH90 1x2x0,8 mm		
117	71	JE-H(St)H FE180 PH90/E30-E90 1x2x0.8	15a	OZSO na pręcie M6 mocowanie do dwuteownika co 600 mm za pomocą ZK8
118		JE-H(St)H FE180 PH90/E30-E90 1x2x0.8		
119	70	HTKSH PH90 1x2x0,8 mm		
120		HTKSH PH90 1x2x0,8 mm		
121	65	HDGs FE180 PH90/E30-E90 3x2.5 mm ²	16	Ceownik CWP/CWOP 40H40/...B-40 1.5 m /5kg/m / grubość blachy 1,5 mm Mocowanie do betonu: Tuleja stalowa R-DCA-08-30 (RAWLPLUG)
122		HDGs FE180 PH90/E30-E90 3x2.5 mm ²		
123	64	HDGs FE180 PH90/E30-E90 2x1 mm ²		
124		HDGs FE180 PH90/E30-E90 2x1 mm ²		
125	63	HDGs FE180 PH90/E30-E90 2x1 mm ²	17	Korytka kablowe KGL/KGOL 50H60/... B-50 1.5 m /5kg/m / grubość blachy 0,7 mm Mocowanie: Wieszak WC50 Mocowanie do betonu: Kotwa stalowa R-RBP-M6 (RAWLPLUG)
126		HDGs FE180 PH90/E30-E90 2x1 mm ²		
127	62	JE-H(St)H FE180 PH90/E30-E90 1x2x0.8		
128		JE-H(St)H FE180 PH90/E30-E90 1x2x0.8		
129	61	HDGs FE180 PH90/E30-E90 5x6 mm ²	18	Rury plastikowe o średnicy Fi 16-40. Mocowanie za pomocą UDF co 600 mm. Mocowanie do betonu: Wkręt stalowy WHO-75052 (RAWLPLUG)
130		HDGs FE180 PH90/E30-E90 5x6 mm ²		
131	60	HDGs FE180 PH90/E30-E90 3x1.5 mm ²		
132		HDGs FE180 PH90/E30-E90 3x1.5 mm ²		



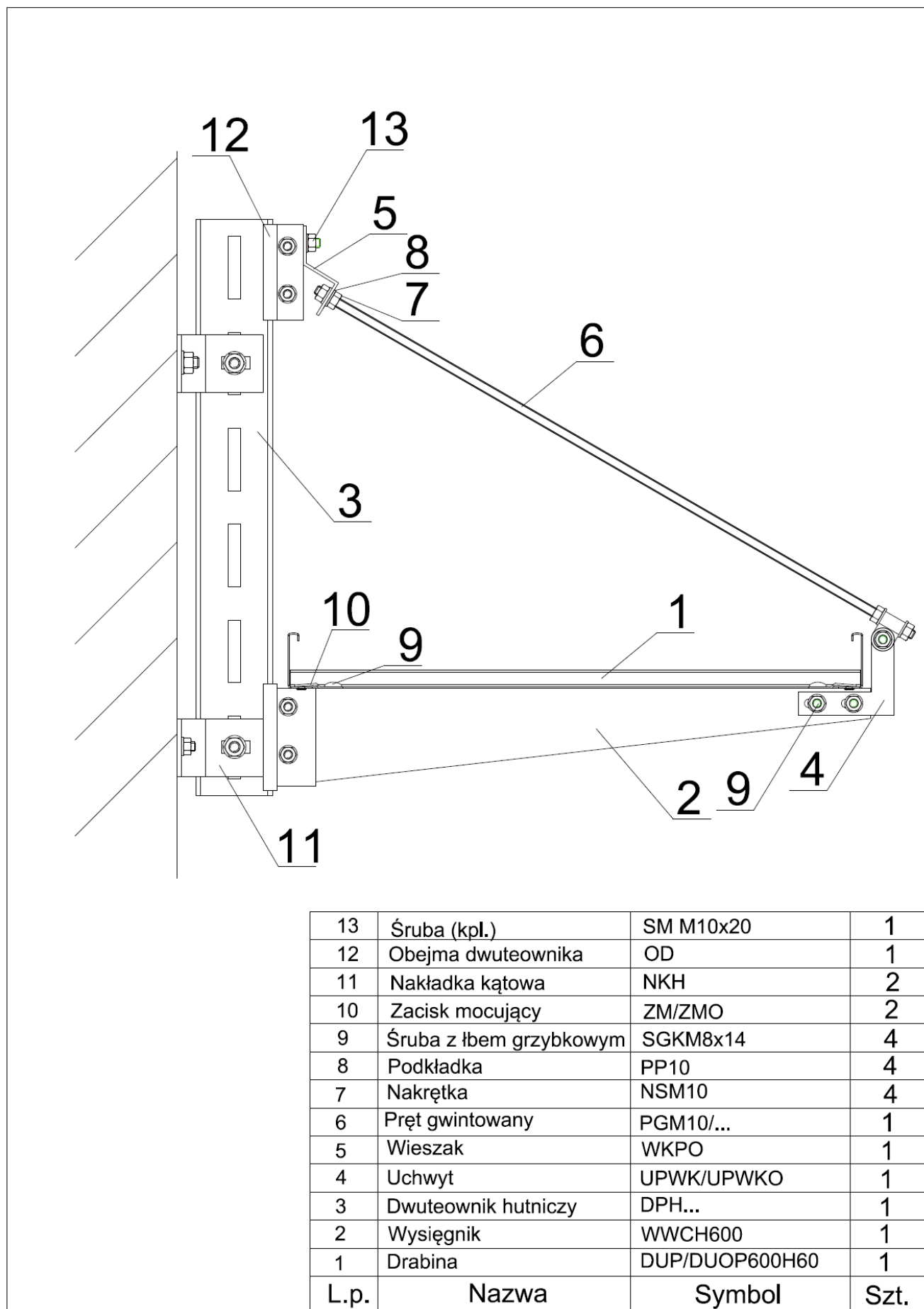
DRAWINGS

No	No FIRES	Type of cable	Position	Construction fixing, spacing, loading
133	28	(N)HXH-J FE180 PH90/E90 4x50 RM	19	UDFB mocowanie co 600 mm. Mocowanie do betonu: Gwoździe wstrzeliwane R-KNC-6/20 (RAWLPLUG)
134		(N)HXH-J FE180 PH90/E90 4x50 RM		
135	27	NHXH-J FE180 PH90/E90 4x50 RM		
136		NHXH-J FE180 PH90/E90 4x50 RM		
137	12	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
138		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
139	11	NHXH-J FE180 PH90/E90 4x1.5 RE		
140		NHXH-J FE180 PH90/E90 4x1.5 RE		
141	53	HDGs FE180 PH90/E30-E90 2x1 mm ²		
142		HDGs FE180 PH90/E30-E90 2x1 mm ²		
143	52	HTKSH PH90 1x2x0,8 mm		
144		HTKSH PH90 1x2x0,8 mm		
145	32	(N)HXH-J FE180 PH90/E90 4x50 RM	20	Korytka kablowe KGR300H60/... B-300 1.5 m / 10kg/m / grubość blachy 0,5 mm Mocowanie: Ceownik CWP/CWOP40H40/07, pręt gwintowany PG M10/... . Mocowanie do betonu: Tuleja stalowa R-DCA-10-40 (RAWLPLUG)
146		(N)HXH-J FE180 PH90/E90 4x50 RM		
147	31	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
148		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
149	30	(N)HXH-J FE180 PH90/E90 4x50 RM	21	Drabinka DUD/DUOD 300H 60/... B-300/1.5 m / 10kg/m / grubość blachy 1,2 mm Mocowanie: Ceownik CWP/CWOP40H40/07, pręt gwintowany PG M10/... . Mocowanie do betonu: Tuleja stalowa R-DCA-10-40 (RAWLPLUG)
150		(N)HXH-J FE180 PH90/E90 4x50 RM		
151	29	(N)HXH-J FE180 PH90/E90 4x1.5 RE		
152		(N)HXH-J FE180 PH90/E90 4x1.5 RE		

No	Type of cable	Cross-section of cable (approx.)	Weight of cable [kg.m ⁻¹], approx.	Amount
1	NHXH FE180 PH90/E90 1x16 RM	8,6 mm	0,2	3
2	NHXH FE180 PH90/E90 1x240 RM	25 mm	2.5	3
3	NHXH-J FE180 PH90/E90 4x1.5 RE	11 mm	0.2	10
4	NHXH-J FE180 PH90/E90 4x6 RE	14 mm	0.4	2
5	NHXH-J FE180 PH90/E90 4x50 RM	29 mm	2.4	8
6	NHXH-J FE180 PH90/E90 4x1.5 RE	11 mm	0.2	2
7	NHXH-J FE180 PH90/E90 4x50 RM	29 mm	2.4	2
8	NHXCH FE180 PH30/E30 4x1.5/1.5 RE	14 mm	0,3	2
9	NHXCH FE180 PH30/E30 4x50/25 RM	34 mm	2,9	2
10	NHXCHX FE180 PH90/E90 4x1.5/1.5 RE	14 mm	0,3	2
11	NHXCHX FE180 PH90/E90 4x50/25 RM	34 mm	2,9	2
12	(N)HXH-J FE180 PH90/E90 4x1.5 RE	11 mm	0.2	30
13	(N)HXH-J FE180 PH90/E90 4x50 RM	29 mm	2.4	30
14	(N)HXH-J FE180 E30-E60 4x1.5 RE	11 mm	0.2	2
15	(N)HXH-J FE180 E30-E60 4x50 RM	29 mm	2.4	2
16	HTKSH PH90 1x2x0,8 mm	5 mm	0.03	20
17	JE-H(S)tH FE180 PH90/E30-E90 1x2x0.8	6 mm	0.04	4
18	HDGs FE180 PH90/E30-E90 2x1 mm ²	6 mm	0.05	14
19	HDGs FE180 PH90/E30-E90 3x1.5 mm ²	8 mm	0.1	6
20	HDGs FE180 PH90/E30-E90 3x2.5 mm ²	9 mm	0.13	4
21	HDGs FE180 PH90/E30-E90 5x6 mm ²	15 mm	0.4	2
TOTAL				152
Communication cables		50	Power cables	102

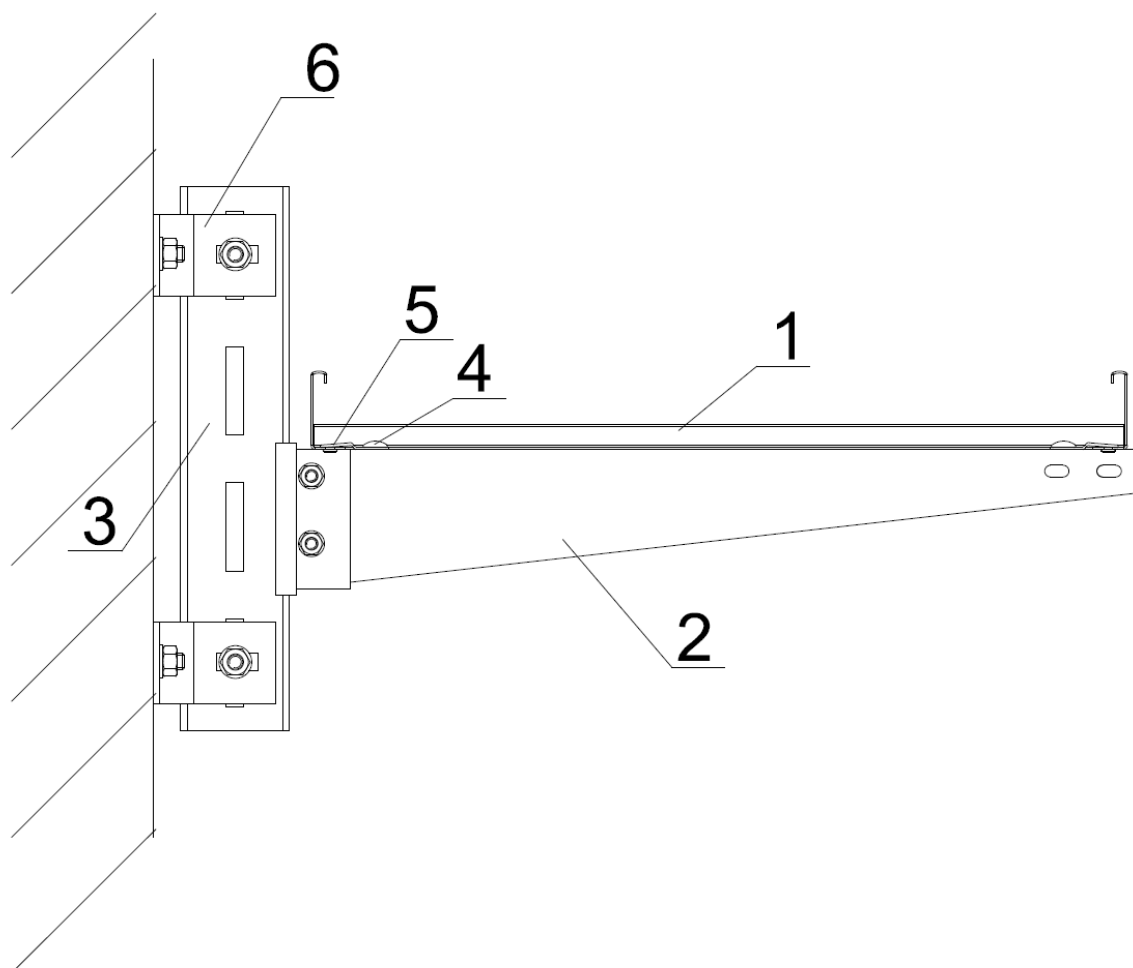


DRAWINGS





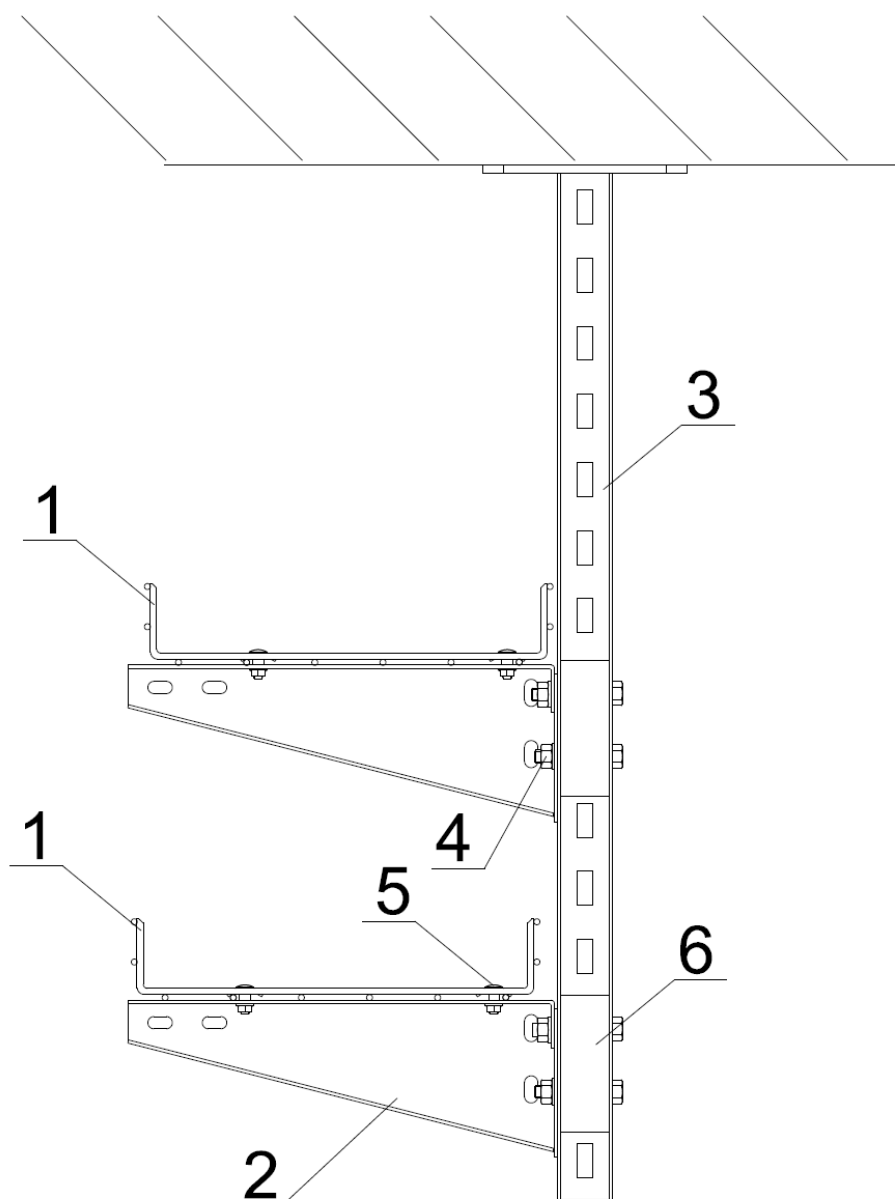
DRAWINGS



6	Nakładka kątowa	NKH	2
5	Zacisk mocujący	ZM/ZMO	2
4	Śruba z łbem grzybkowym	SGKM8x14	2
3	Dwuteownik hutniczy	DPH...	1
2	Wysięgnik	WWCH600	1
1	Drabina	DUP/DUOP600H60	1
L.p.	Nazwa	Symbol	Szt.



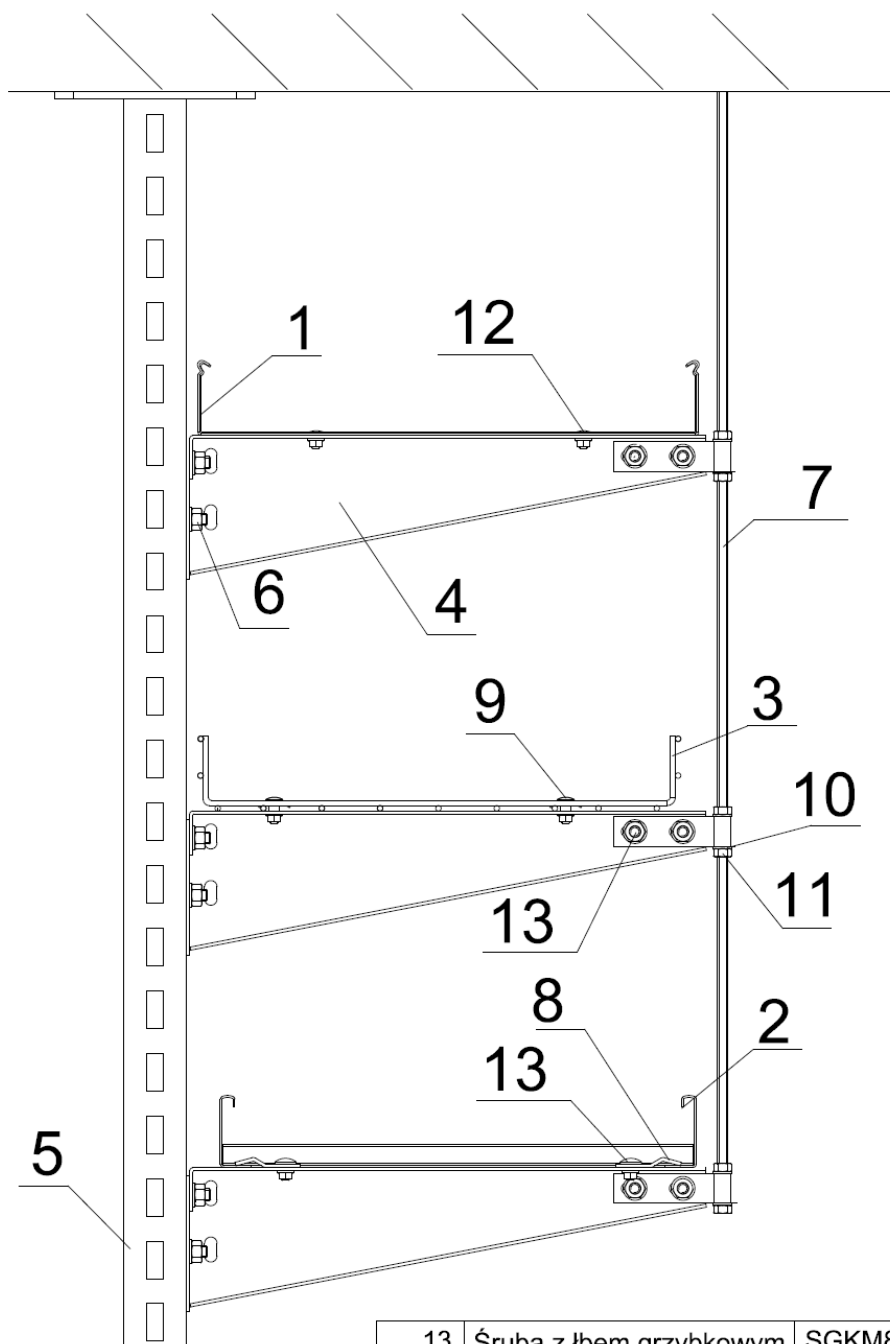
DRAWINGS



6	Blacha rozporowa	BR40	2
5	Zacisk śrubowy	ZSO	4
4	Śruba M10	SMM10x80	4
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO300	2
1	Koryto siatkowe	KDS/KDSO300H60	2
L.p.	Nazwa	Symbol	Szt.



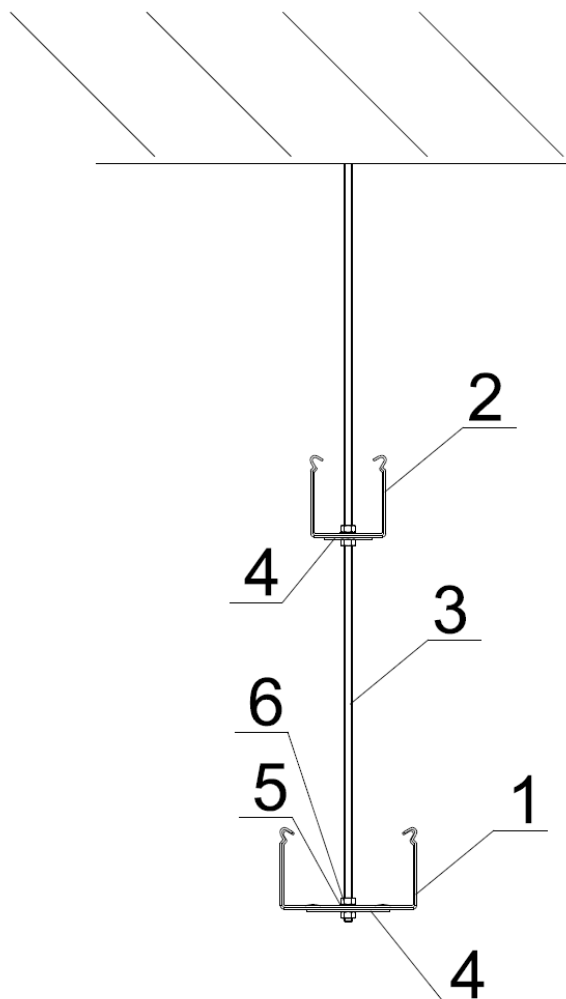
DRAWINGS



13	Śruba z łbem grzybkowym	SGKM8x14	8
12	Śruba z łbem grzybkowym	SGKM6x12	2
11	Nakrętka	NSM10	6
10	Podkładka	PP10	6
9	Zacisk śrubowy	ZSO	2
8	Zacisk mocujący	ZMO	2
7	Pręt gwintowany	PGM10/...	1
6	Śruba M10	SMM10x20	6
5	Wspornik sufitowy	WPCB...	1
4	Wysięgnik	WWS/WWSO400	3
3	Koryto siatkowe	KDS/KDSO400h60	1
2	Drabinka	DUD/DUOD400H60	1
1	Koryto	KGJ/KGOJ400H60	1
L.p.	Nazwa	Symbol	Szt.



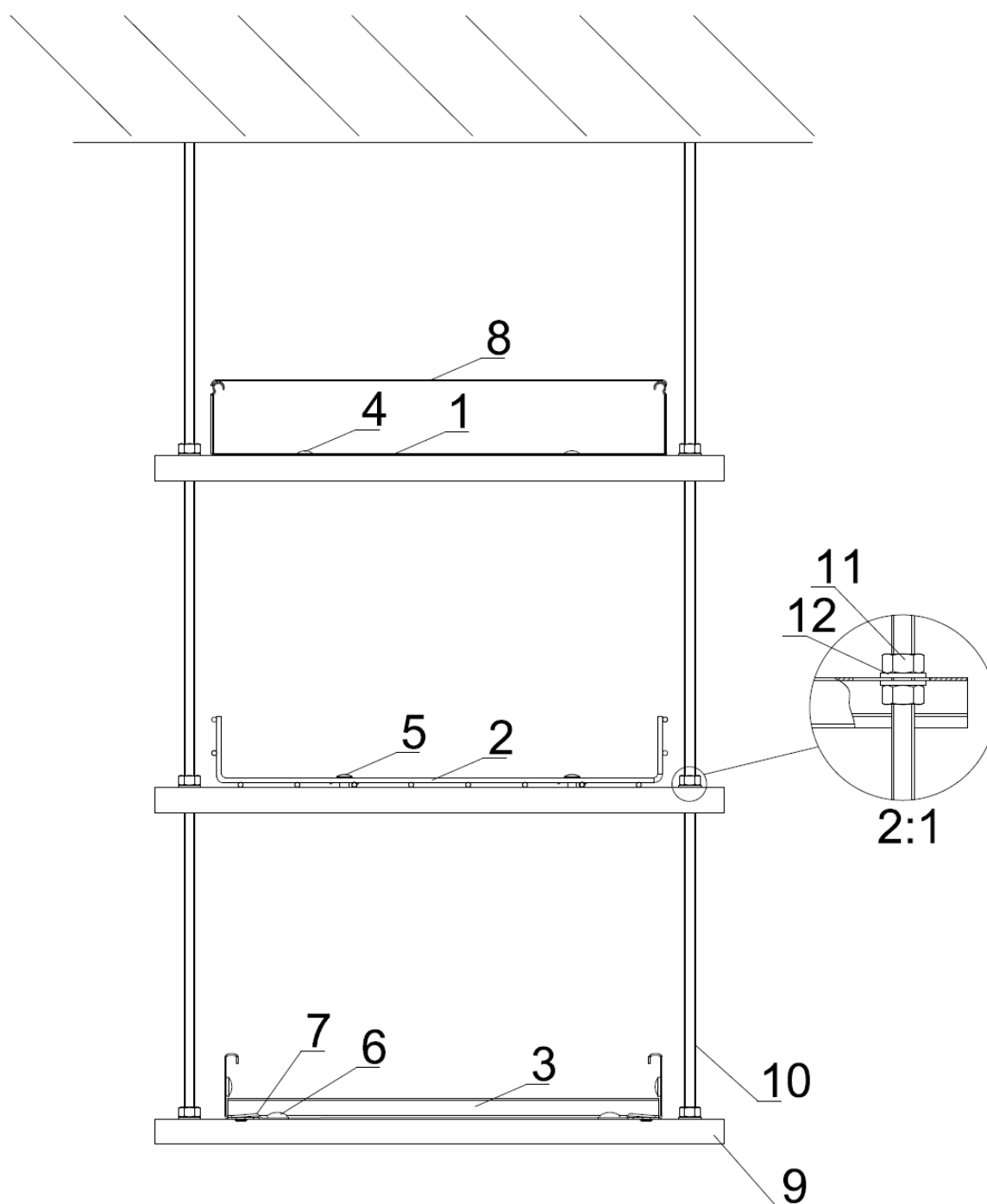
DRAWINGS



6	Nakrętka	NSM6	2
5	Podkładka powiększona	PW6	2
4	Zacisk	ZSW	2
3	Pręt gwintowany	PGM6/...	1
2	Koryto	KGL/KCL/KPL50H60	1
1	Koryto	KGL/KGOL100H60	1
L.p.	Nazwa	Symbol	Szt.



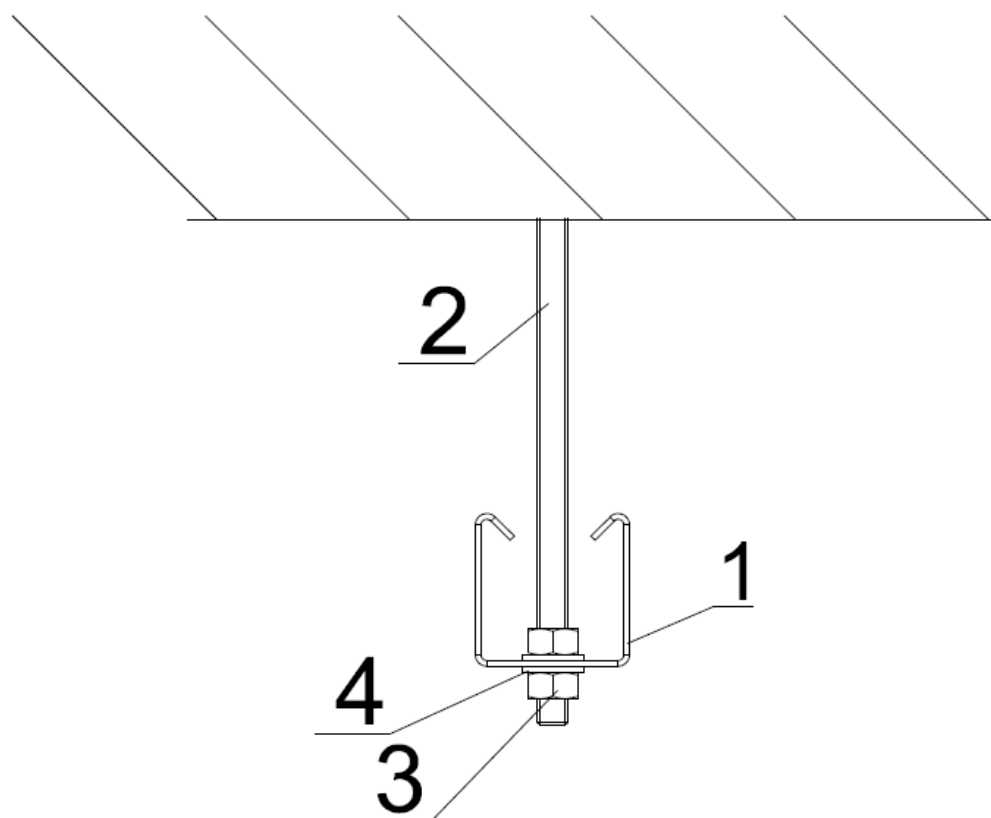
DRAWINGS



12	Podkładka	PP10	12
11	Nakrętka	NSM10	12
10	Pręt gwintowany	PGM10	2
9	Ceownik	CWP40H22/...	3
8	Pokrywa koryta	PKJ	1
7	Zacisk mocujący	ZM/ZMO	2
6	Śruba z łbem grzybkowym	SGKM8x14	2
5	Zacisk śrubowy	ZS/ZSO	2
4	Śruba z łbem grzybkowym	SGKM6x12	2
3	Drabina	DUD/DUOD400H60	1
2	Koryto siatkowe	KDS/KDSO400H60	1
1	Koryto	KBJ/KBOJ400H60	1
L.p.	Nazwa	Symbol	Szt.



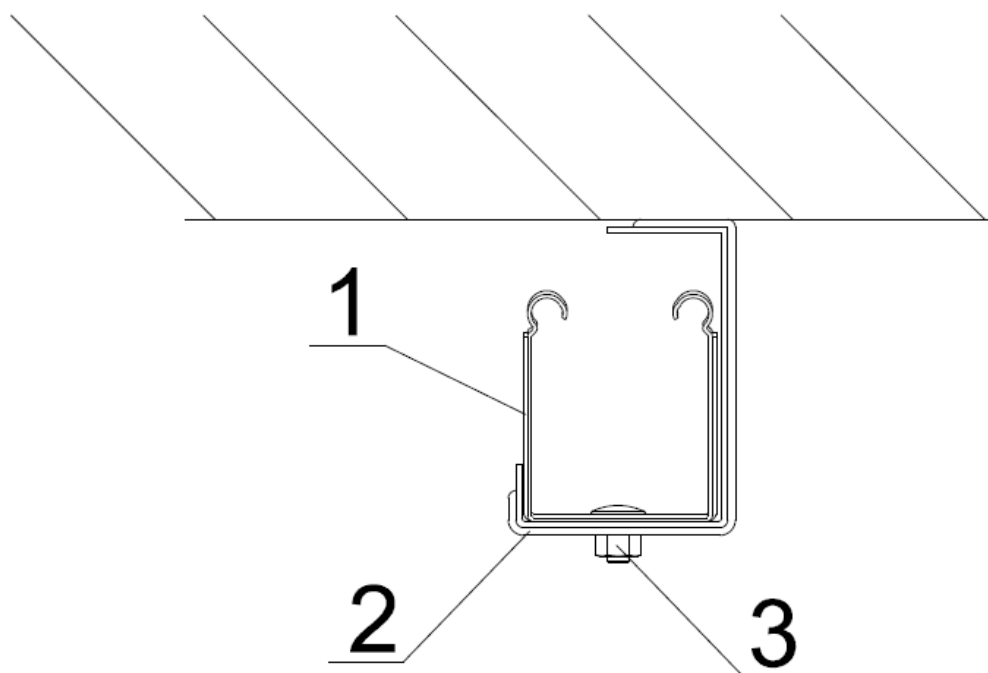
DRAWINGS



4	Podkładka	PW8	2
3	Nakrętka	NSM8	2
2	Pręt gwintowany	PGM8/...	1
1	Ceownik wzmocniony	CWP/CWOP40H40/...	1
L.p.	Nazwa	Symbol	Szt.



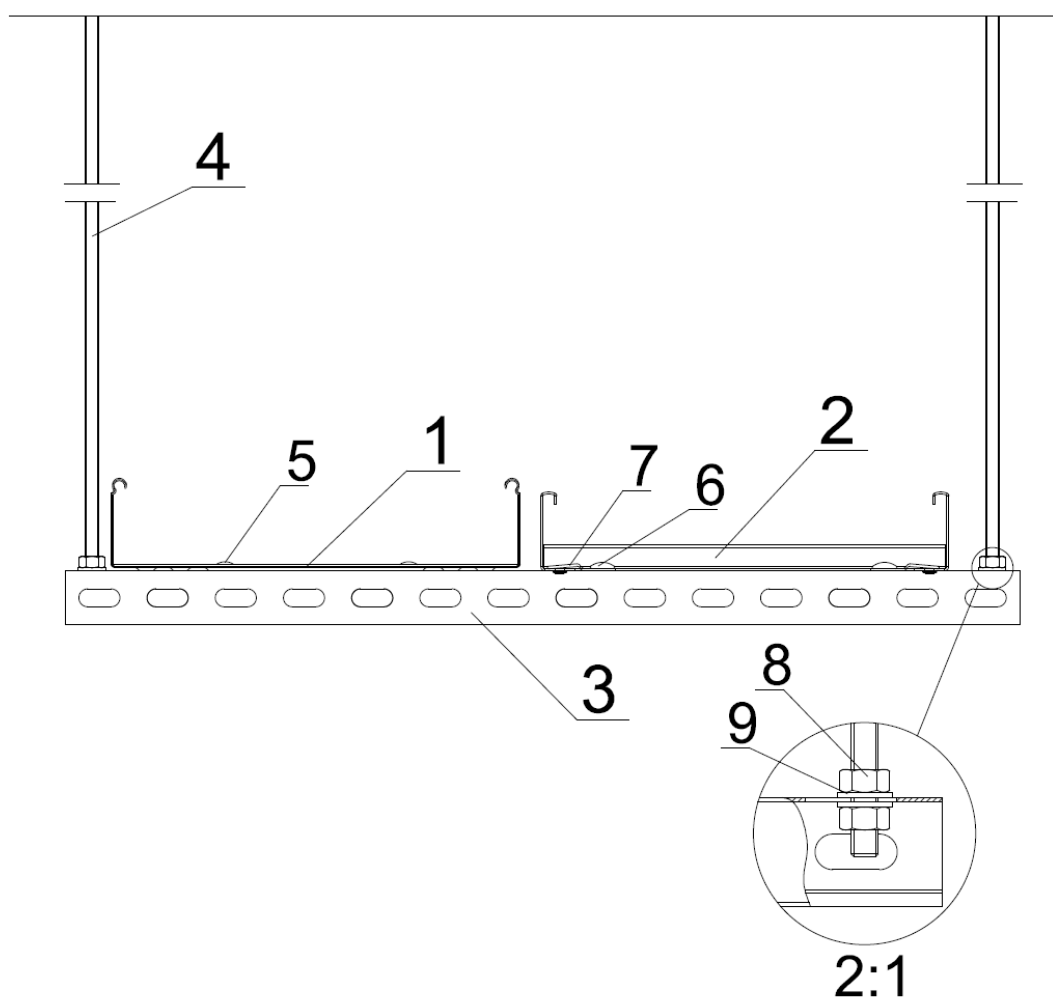
DRAWINGS



3	Śruba z łbem grzybkowym	SGKM6x12	1
2	Wieszak	WC50	1
1	Koryto	KGL/KCL/KPL50H60	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS

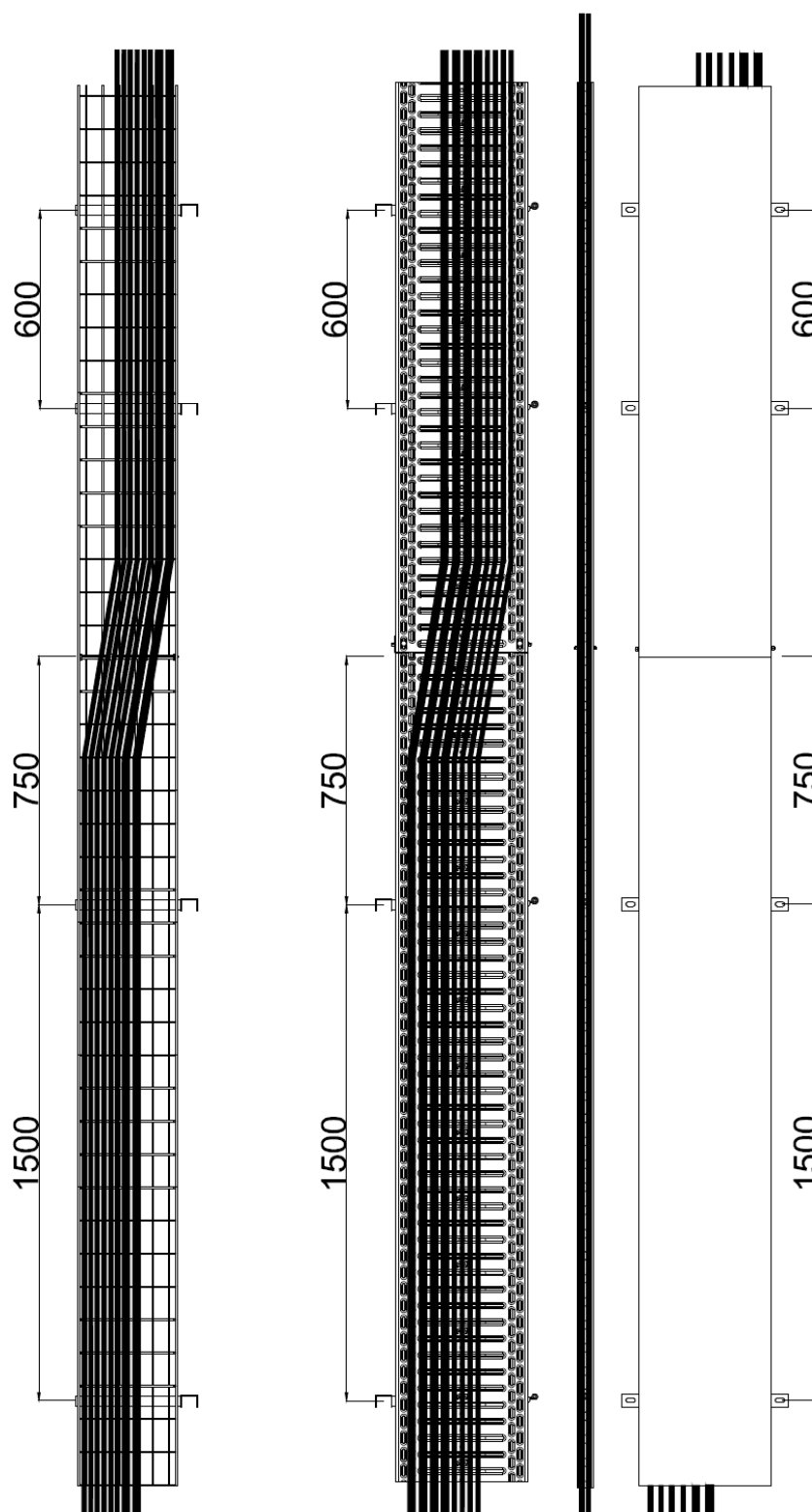


9	Podkładka	PP10	4
8	Nakrętka	NSM10	4
7	Zacisk mocujący	ZM/ZMO	2
6	Śruba z łbem grzybkowym	SGKM8x14	2
5	Śruba z łbem grzybkowym	SGKM6x12	2
4	Pręt gwintowany	PGM10/...	2
3	Ceownik	CWO/CWOP40H40/...	1
2	Drabina	DUD300H60	1
1	Koryto	KGR300H60	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS

A-A

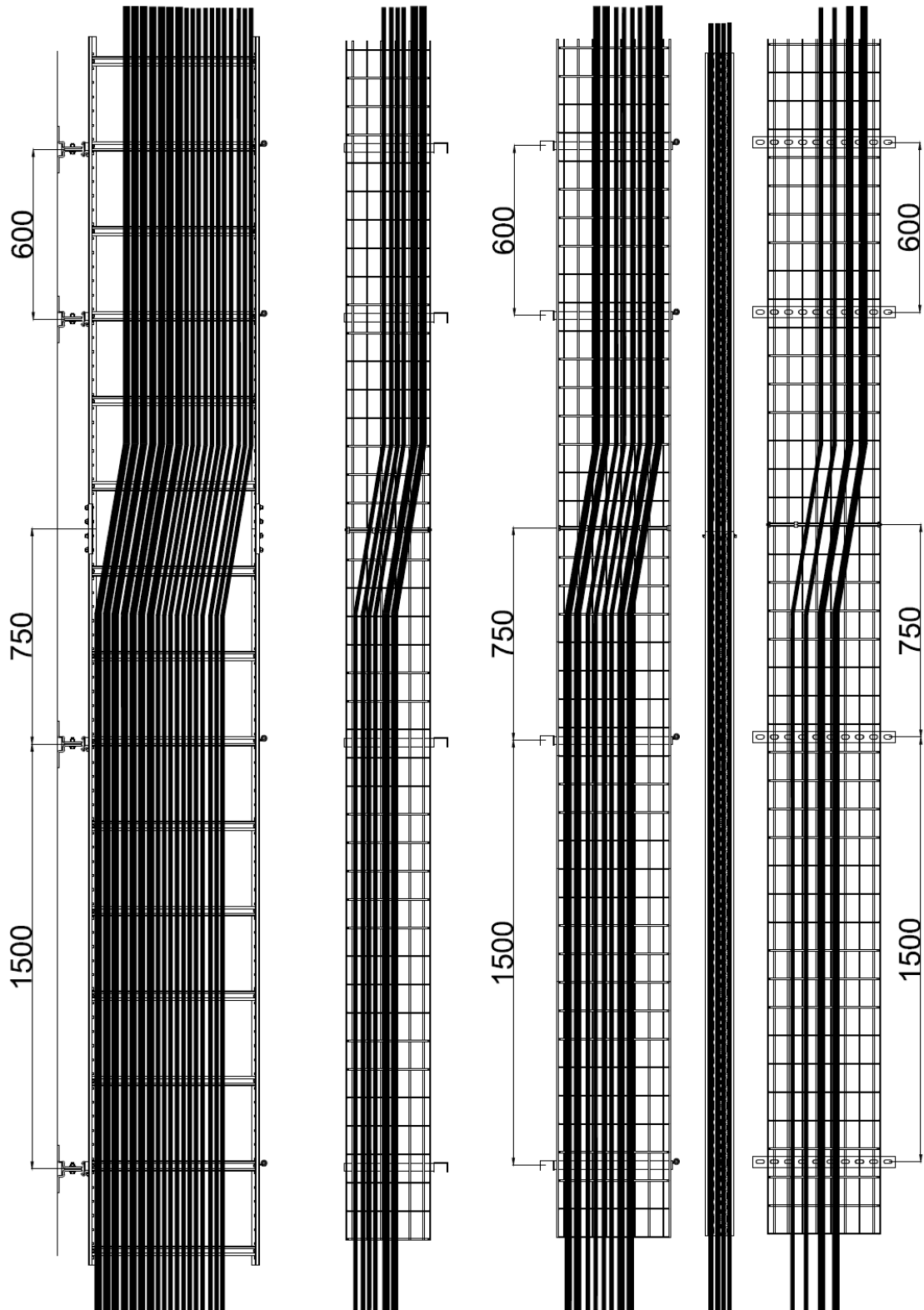


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DRAWINGS

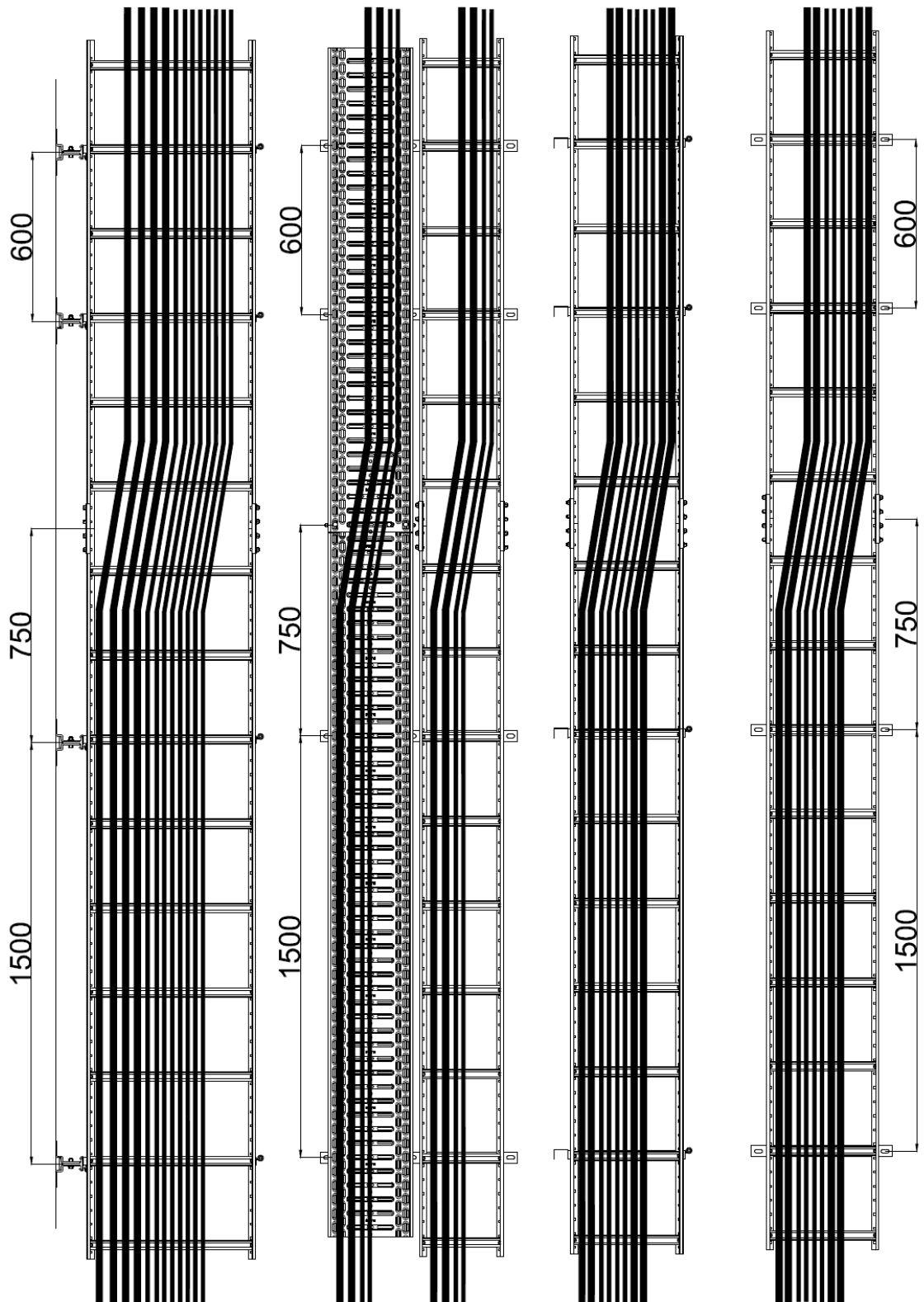
B-B



TECHNOKABEL - BAKS- KOELNER 2014.12.11



C-C

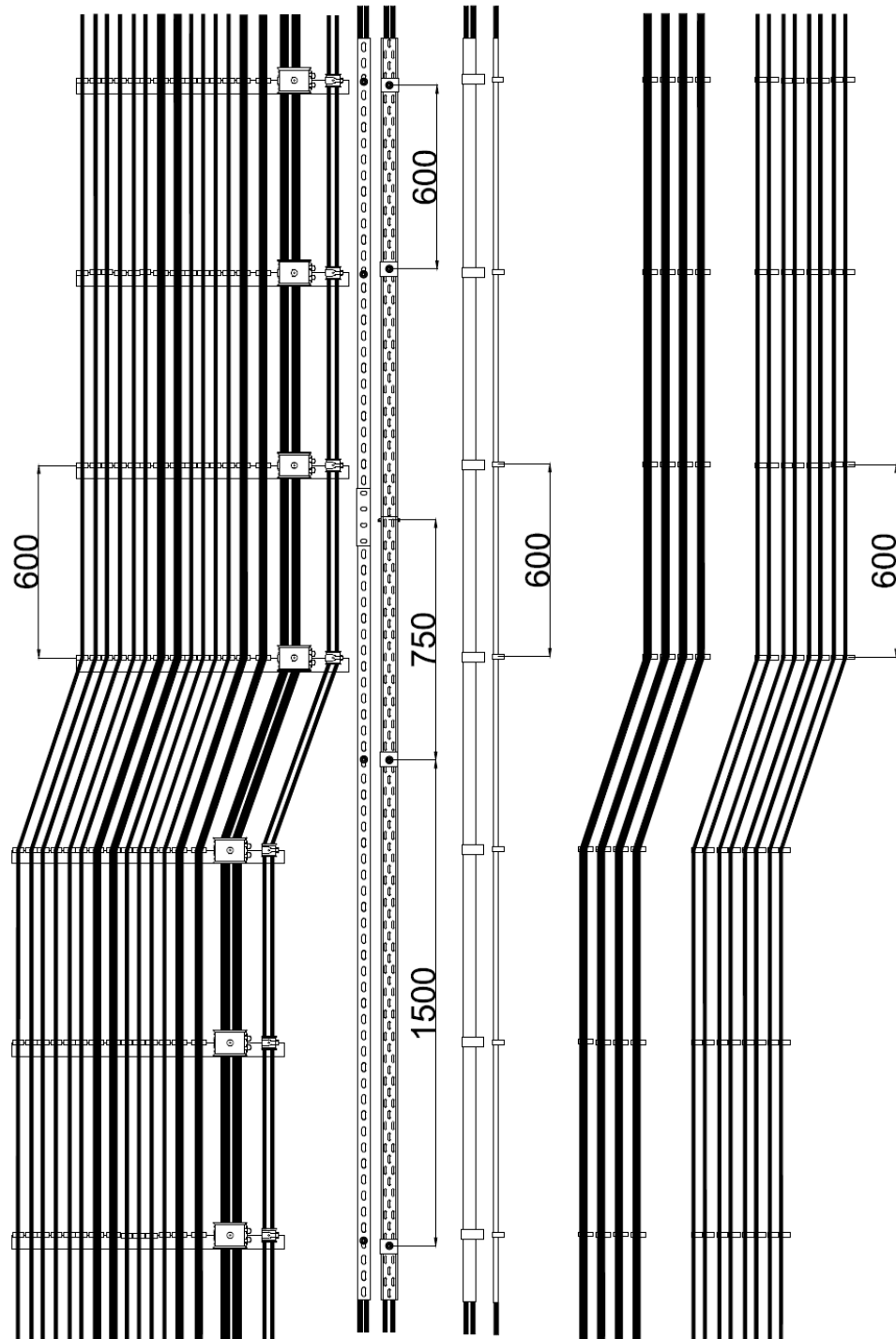


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DRAWINGS

D-D

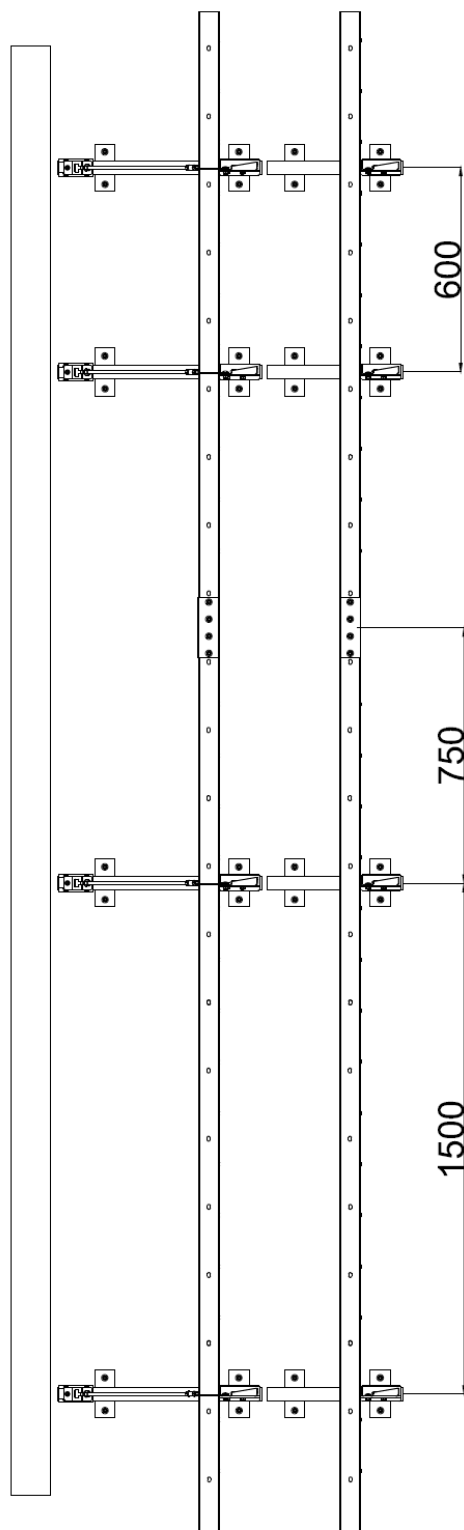


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DRAWINGS

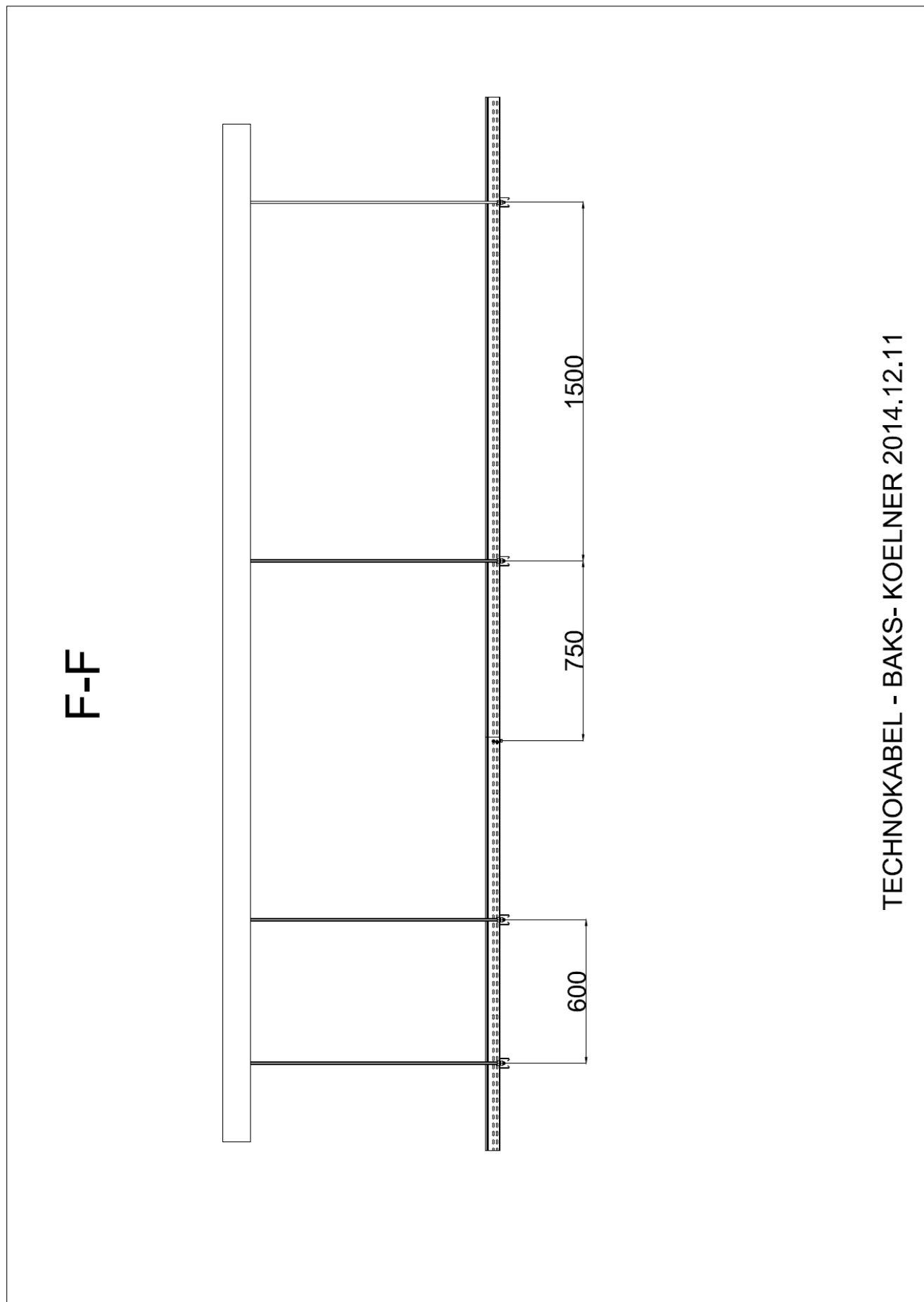
E-E



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DRAWINGS

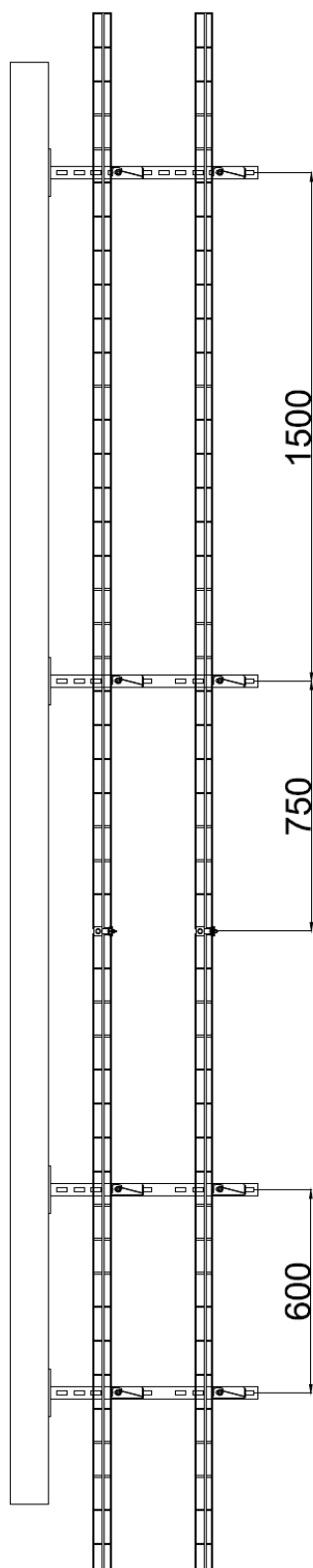


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DRAWINGS

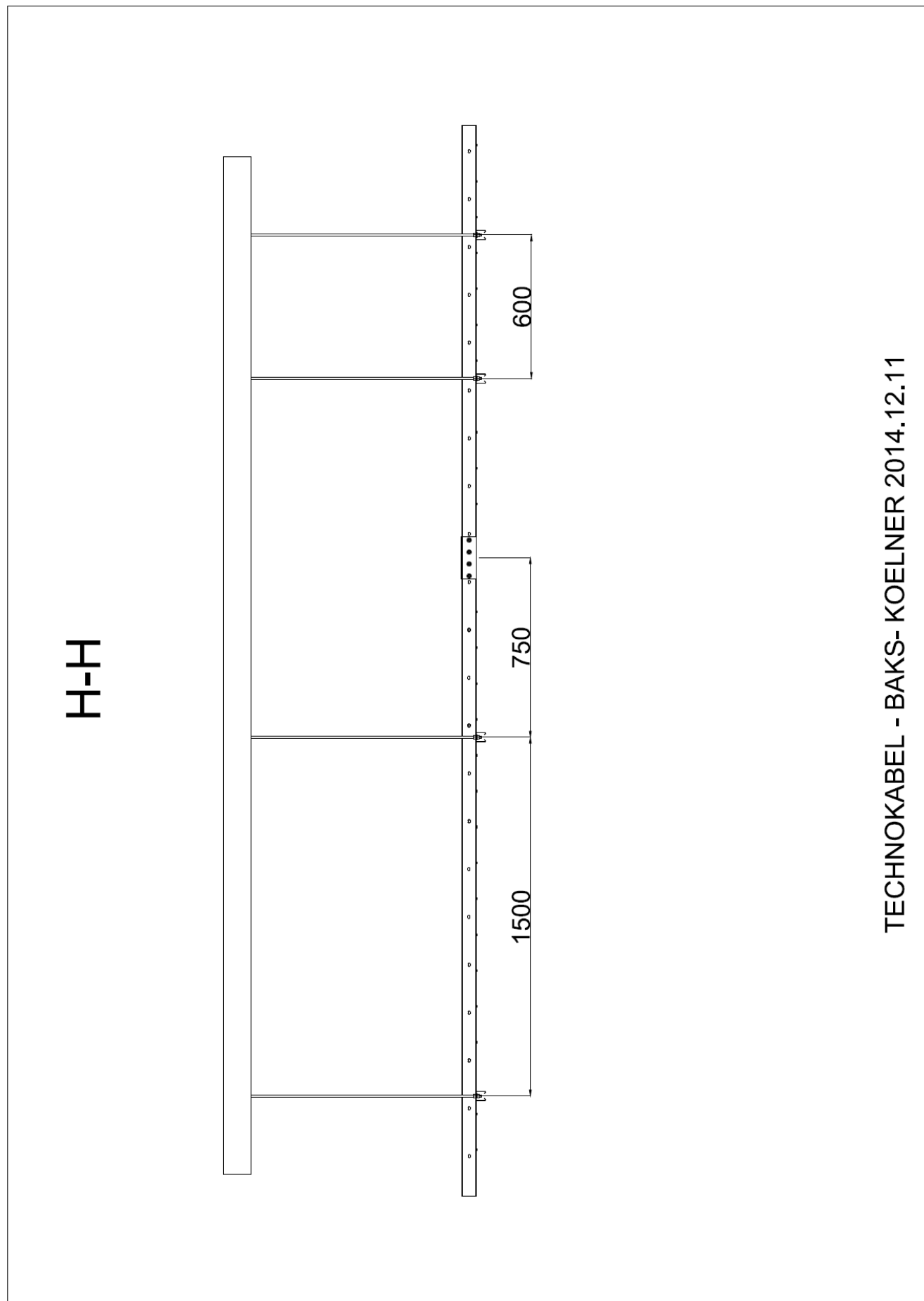
G-G



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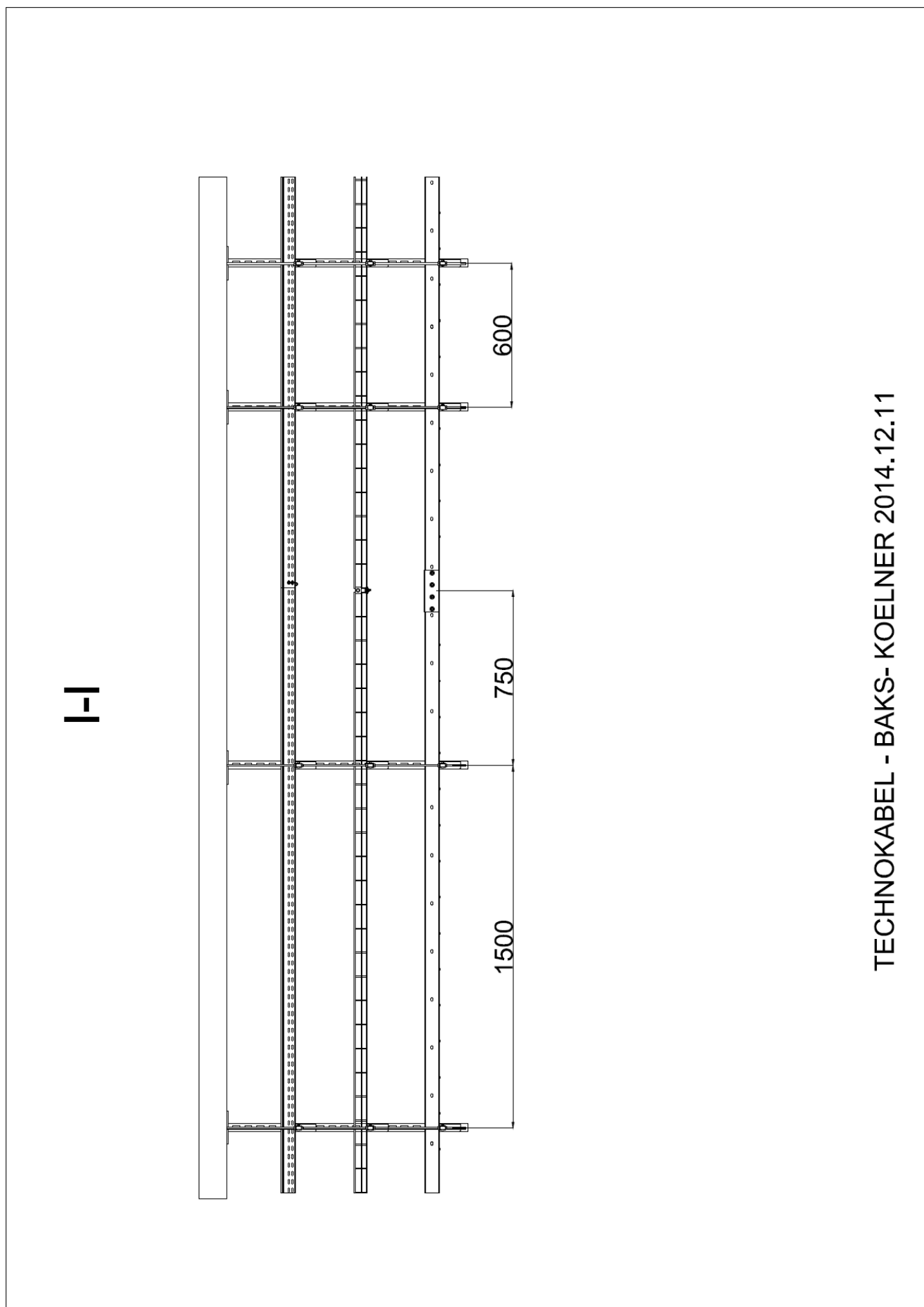
DRAWINGS



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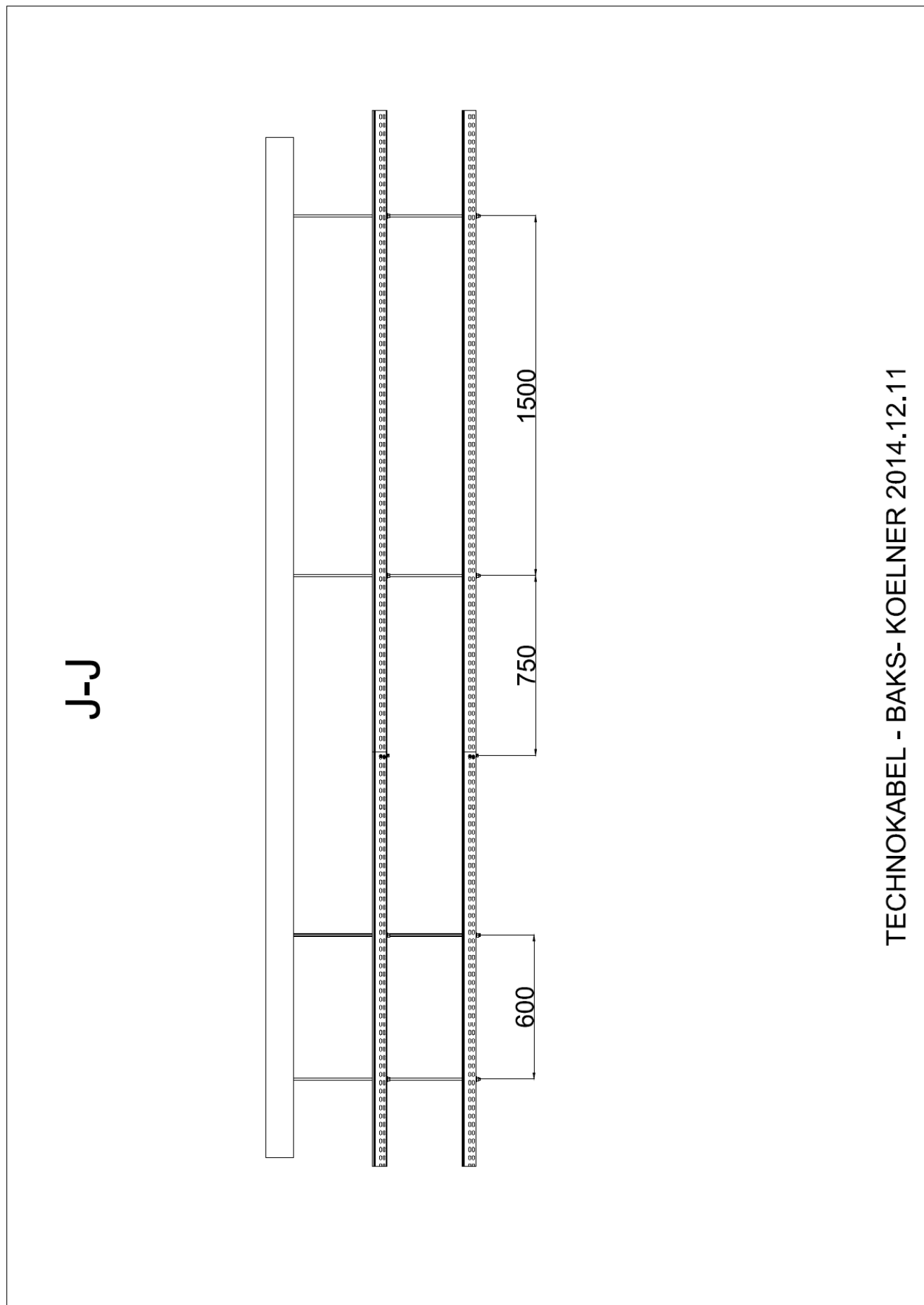


DRAWINGS





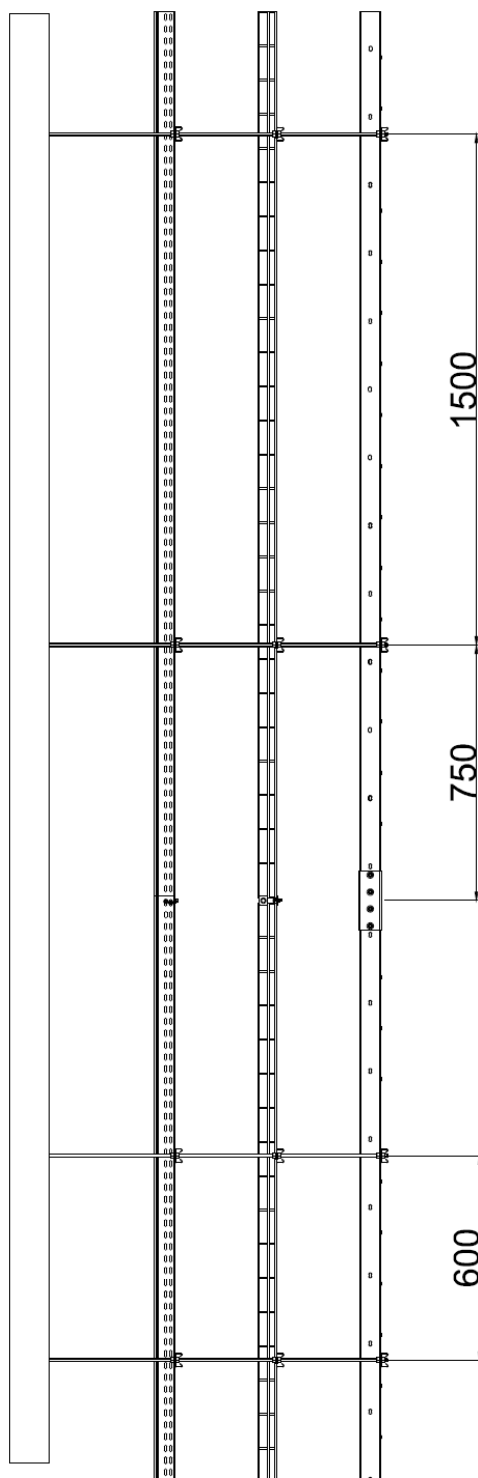
DRAWINGS



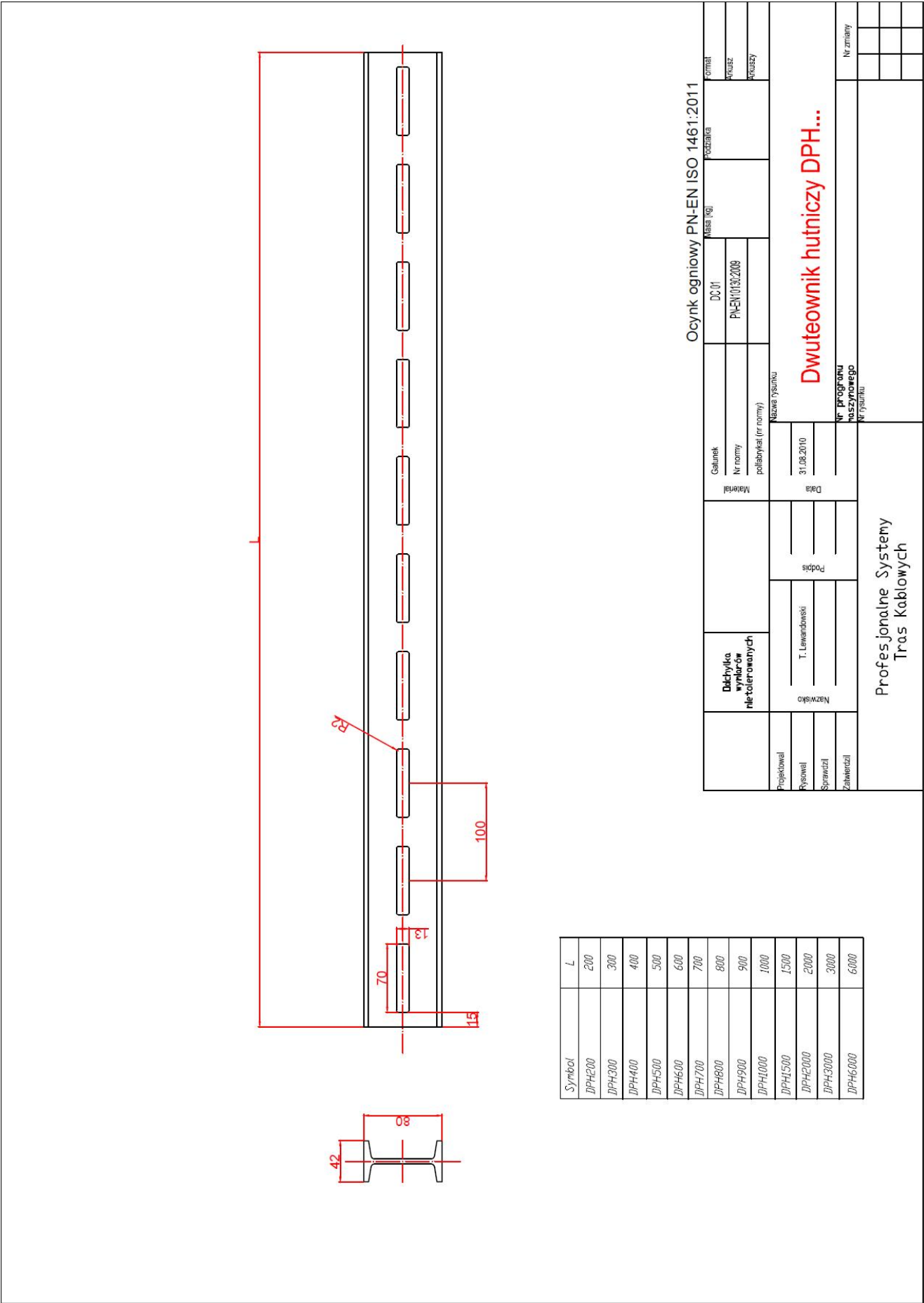


DRAWINGS

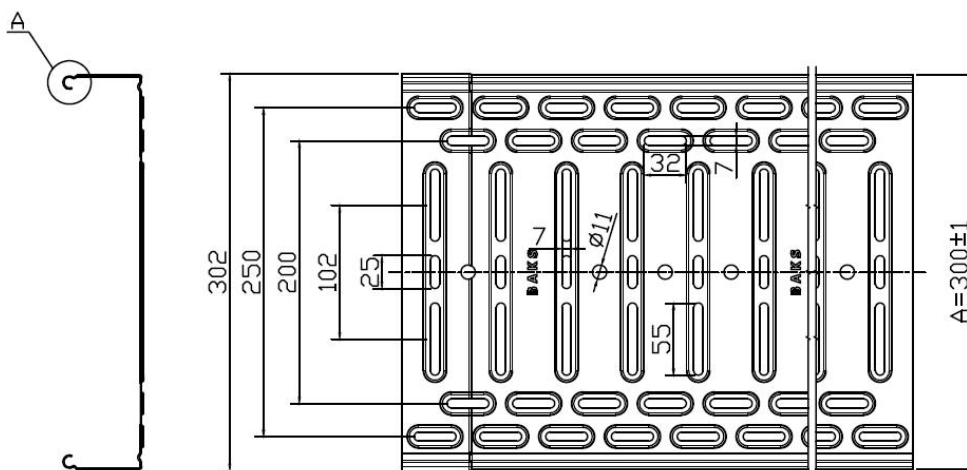
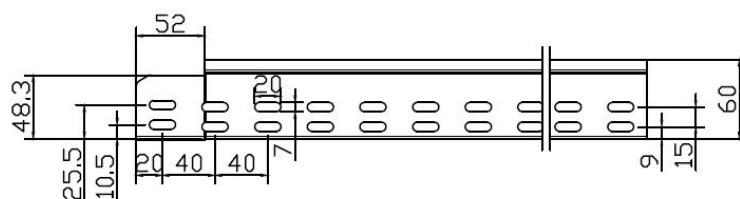
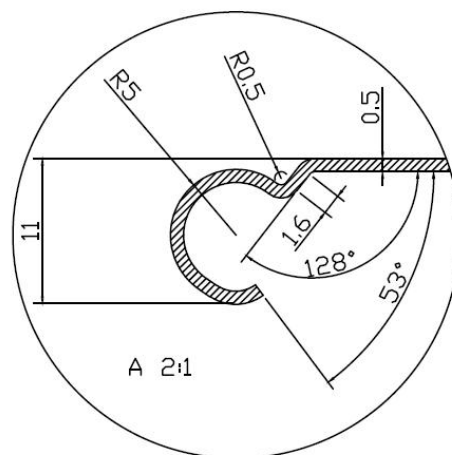
K-K



TECHNOKABEL - BAKS-KOELNER 2014.12.11

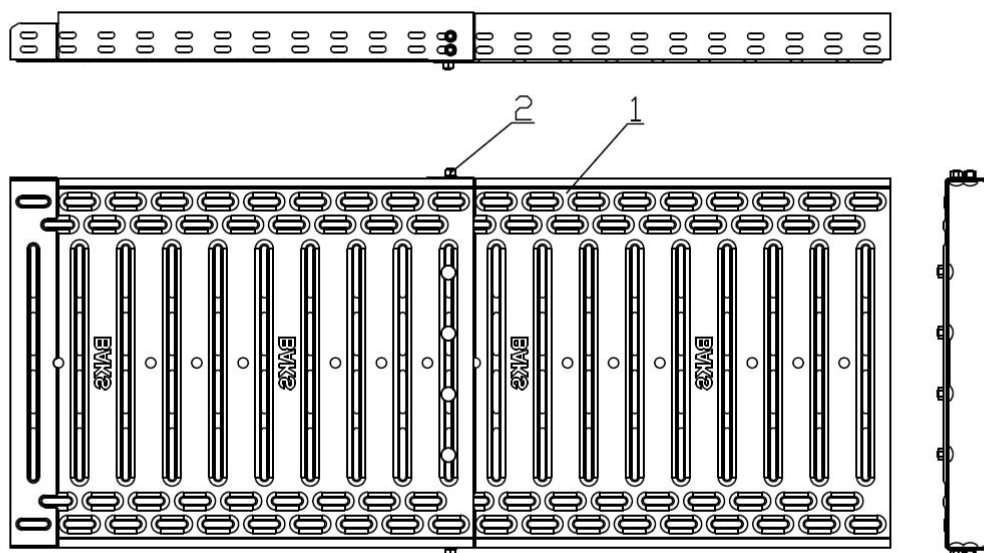
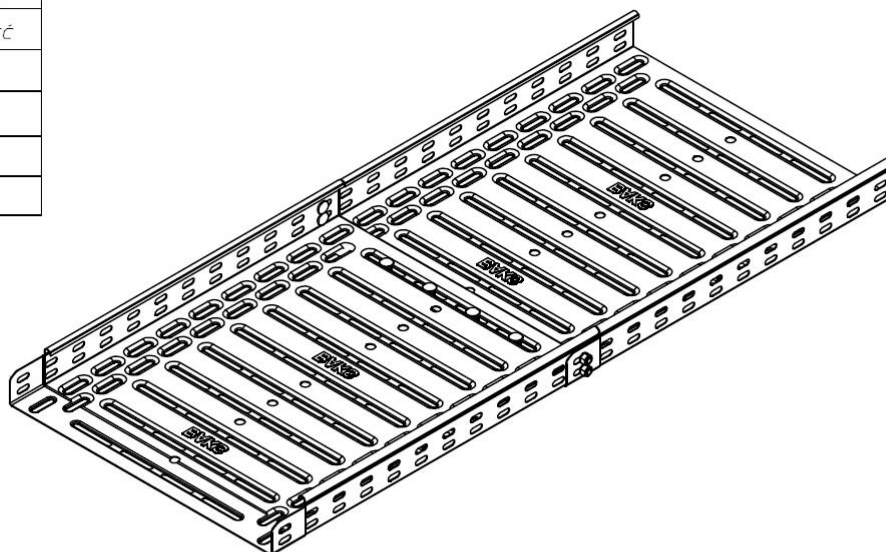


Typ	Szerokość A(mm)	Długość L(mm)
KGR100H60/3	100	3000
KGR150H60/3	150	3000
KGR200H60/3	200	3000
KGR300H60/3	300	3000

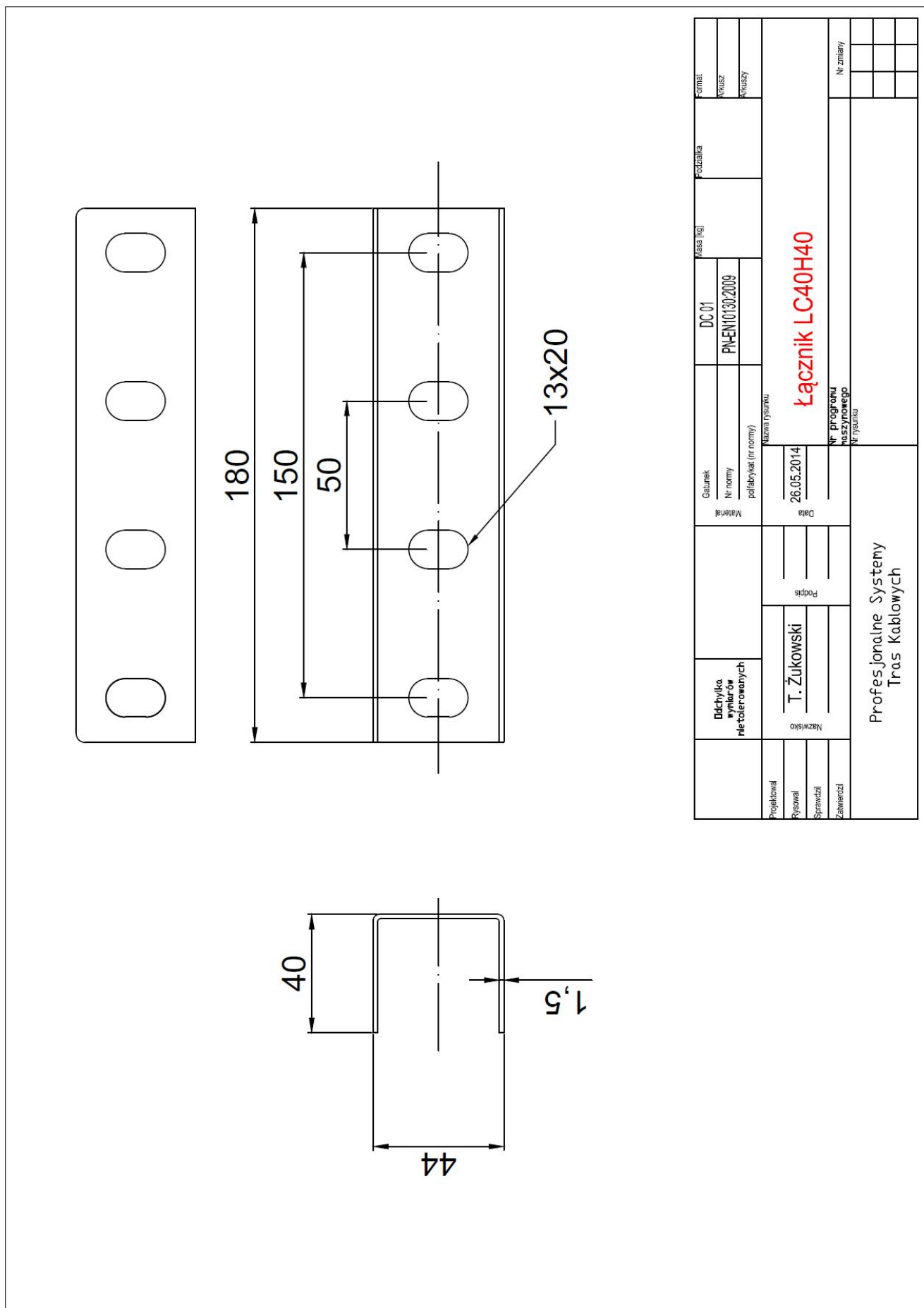


	Długośćka wytarów		Materiał		Masa (kg)		Podziałka		Format		
	nieterowanych		Nr normy				1:5		A4		
			półfabrykat (nr normy)						Arkuszy		
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku							
Rysował				KGR...H60/3							
Sprawdził											
Zatwierdził											
				Nr programu maszynowego						Nr zmlony	
 Profesjonalne Systemy Tras Kablowych				Nr rysunku							

	<i>Poz.1</i>	<i>Poz.2</i>
<i>A</i>	<i>Typ</i>	<i>Ilość</i>
<i>100</i>	<i>KGR100H60/3</i>	<i>6</i>
<i>150</i>	<i>KGR150H60/3</i>	<i>6</i>
<i>200</i>	<i>KGR200H60/3</i>	<i>7</i>
<i>300</i>	<i>KGR300H60/3</i>	<i>8</i>



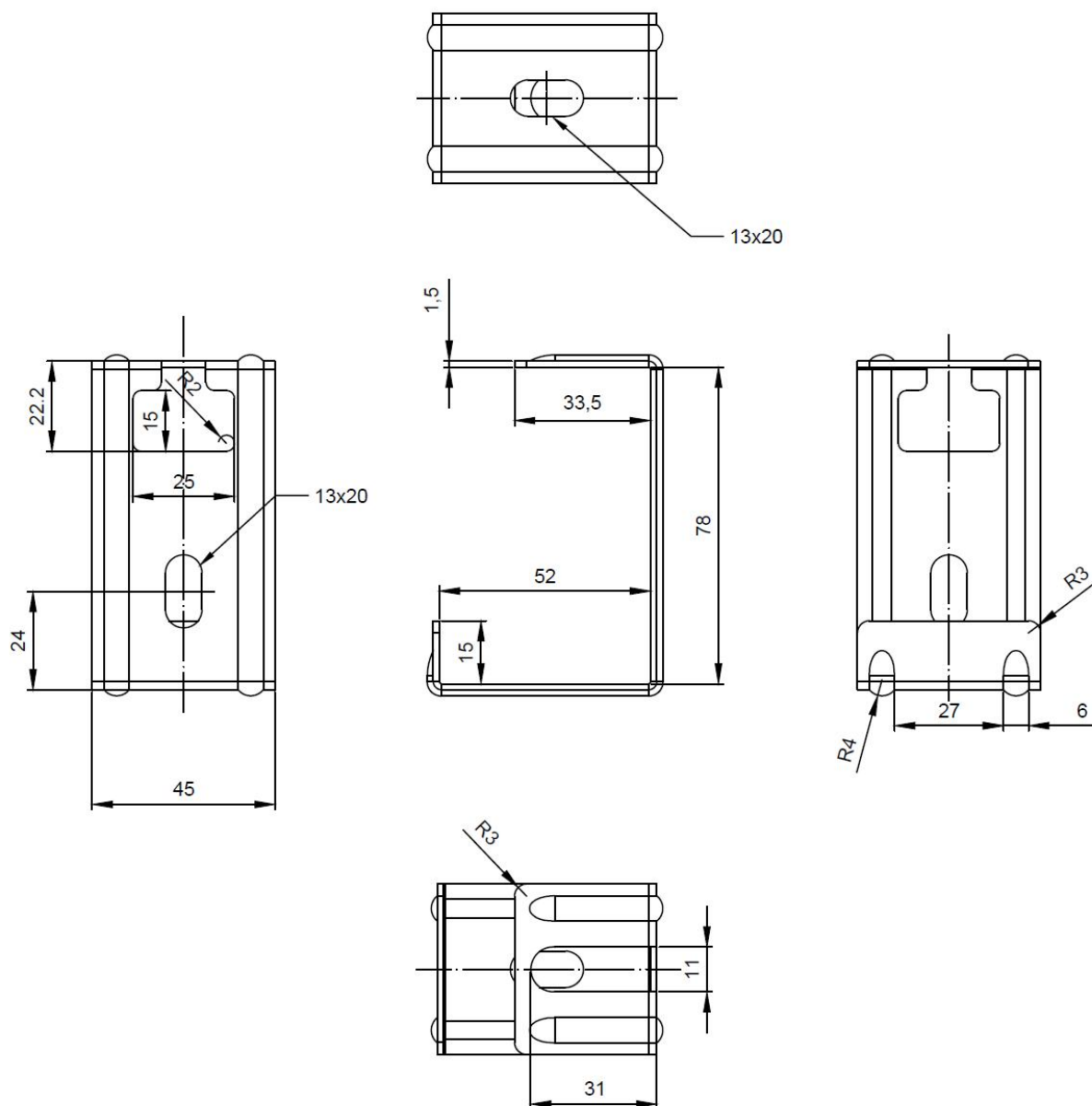
2	Śruba z łbem grzybkowym		SGK M6x12			8						
1	Korytka		KGR300H60/3			2						
L.p.	Nazwa		Symbol		Materiał		Szt.	Nr katalogowy				
		Długość wykładów nieolerowanych		Materiał		Gatunek		Masa lkgł	Podziałka	Format A4 Arkusz 1 Kuszy 1		
											Nr normy	
											polfabrykat (nr normy)	
Projektował		Nazwa rysunku		Potączenie KGR300H60/3		Nr programu maszynowego		Nr rysunku		Nr znlany		
Rysował												
Sprawdził												
Zatwierdził												
		Profesjonalne Systemy Tras Kablowych										



Technical drawing of a 90-degree elbow fitting for a cable tray system. The drawing includes three views: a front view showing a rectangular body with a width of 60 and a central circular opening; a side view showing the profile with a height of 90, a horizontal leg of 65, and a vertical leg of 20, with a 5mm gap at the top; and a top view showing a square base with rounded corners (R5), a central threaded hole (13x30), and a height of 10. The drawing is labeled 'Nakładka kątowna dwuteownika NKH'.



DRAWINGS



	Odchyłka wyniarów nieolerowanych		Materiał	Gatunek Nr normy polifabrykat (nr normy)	Masa [kg]	Podziałka 1:1	Format A3 Arkusz 1 Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku Wieszak WC50			
Rysował				Nr programu maszynowego Nr rysunku			
Sprawdził							
Zatwierdził							
Profesjonalne Systemy Tras Kablowych				Nr zmiany			

Technical drawing of a metal profile, likely a door or window frame component. The drawing includes three views: a side elevation, a top view, and a cross-section.

- Side Elevation:** Shows a long, narrow profile with a total length of 46. It features two circular holes, each with a diameter of 40, spaced 31 apart. The profile is labeled "2otwory 9x18" (2 holes 9x18).
- Top View:** Shows the profile's width and the spacing between the holes. The distance between the centers of the holes is 40. The profile is labeled "2otwory 9x18".
- Cross-section:** Shows the profile's cross-section with a width of 28. It features a central hole with a diameter of 40. The profile is labeled "2otwory 9x18".
- Labels:**
 - "2otwory 9x18" (2 holes 9x18) is repeated for each view.
 - "A- otworów 7-9x26" (A- holes 7-9x26) is labeled near the top view.
 - "a5B" is labeled near the cross-section.

[illegible]



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