

TEST REPORT FIRES-FR-202-15-AUNE

Cable bearing system BAKS with cables business Tele-Fonika Kable S.A. with fixing accessories of RAWLPLUG S.A.

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TEST REPORT

FIRES-FR-202-15-AUNE

Tested property: Functional resistance in fire
STN 92 0205: 2014

Test method: (ZP-27/2008, DIN 4102-12: 1998-11) acc. to cl. 1 of this test report

Type of test: Accredited

Date of issue: 12. 01. 2016

Name of the product: Cable bearing system BAKS with cables business Tele-Fonika Kable S.A. with fixing accessories of RAWLPLUG S.A.

Manufacturer: BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland (producer of cable bearing system)
Tele-Fonika Kable S.A., ul. Wielicka 114, 30-663 Kraków, Poland (producer of cables)
RAWLPLUG S.A., Kwizdyńska 6, 51-416 Wrocław, Poland (producer of fixing accessories)

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

Test carried out by: FIRES, s.r.o., Testing laboratory

Task No.: PR-15-0379

Specimen received: 12. 10. 2015

Date of the test: 15. 10. 2015

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

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1. INTRODUCTION

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

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

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

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

Sponsor's representatives witnessing the test:

Mr. Jacek Kliczek	BAKS Kazimierz Sielski
Mr. Jakub Chociński	BAKS Kazimierz Sielski
Mr. Łukasz Daniel	Tele-Fonika Kable S.A.
Mr. Marcin Zywiński	Tele-Fonika Kable S.A.
Mr. Jacek Nowicki	Koelner (RAWLPLUG)
Mr. Sebastian Czekan	Koelner (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	Horizontal test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 020	Driver Tecomat - Reliance (SW)	-
F 71 041, F 71 042	Transducer of differential pressure (-50 to + 150) Pa	measurement of pressure inside the test furnace
F 54 027	Digital calliper (0 to 200) mm	-
F 54 056	Racking meter	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-



Identification number	Measuring equipment	Note
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	measurement of climatic conditions
F 10 521 - F 10 528	Plate thermometers	measurement of temperature inside the test furnace according to EN 1363-1
F 10 701	Sheathed thermocouple type K Ø 3 mm	measurement of ambient temperature
F 57 005	Digital stop-watch	-
F 96 015	Test signal panel	-

3. PREPARATION OF THE SPECIMEN

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 Tele-Fonika Kable S.A. under supervision of laboratory technician.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing system of company BAKS Kazimierz Sielski – cable trays, mesh trays, ladders, cable clamps with accessories (consoles, brackets, supports, hangers, etc.) and power and communication halogen free cables of company Tele-Fonika Kable S.A..

Cables used by test:

Power cables:

Flame-X 950 (N)HXH FE180/E90 4x1,5RE	(19x)
Flame-X 950 (N)HXH FE180/E90 4x6RE	(2x)
Flame-X 950 (N)HXH FE180/E90 4x50RM	(14x)
Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	(18x)
Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	(18x)

Communication cables:

Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	(15x)
Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	(12x)

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

Cable bearing systems were made of following constructions:

Suspension tracks No. 1 – 6

Tracks are made of four consoles combined of three supports (CWP40H22/05) and two threaded rods (PG M10) fixed together by washers (PP10) and nuts (NS M10). Consoles are fixed to ceiling in spacing of 1500 mm.

Tracks No. 1 and 4:

Cable trays (KFL300H60, height 60 mm, width 300 mm, steel sheet thickness 0,7 mm) fixed together by integrated junctions. Partition (PGL60) is fixed by screws (SGK M6x12) in distance of 100 mm of cable tray side. Trays are fixed to brackets by screws (SGK M6x12) and loaded with 20kg.m⁻¹. Cables are not fixed to cable trays.

Tracks No. 2 and 5:

Cable mesh trays (KDSZ400H60, height 60 mm, width 400 mm, steel wire Ø 4,5 mm) fixed together by integrated junctions. Partition (PGL50) is fixed by junctions (ZS/ZSO) in distance of 100 mm of mesh tray



side. Mesh trays are fixed to supports by junctions (ZS/ZSO, 2 pcs) and loaded with 20kg.m^{-1} . Cables are fixed to mesh trays by cable clamps (UKZ1/UKZO1).

Tracks No. 3 and 6:

Cable ladders (DFP400H60, height 60 mm, width 400 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by integrated junctions. Partition (PGDJ40) is fixed by nut bolts (SR M6x16) in distance of 100 mm of cable ladder side. Ladders are fixed to brackets by junctions (ZM/ZMO, 2 pcs) and nut bolts (SGK M8x14, 2 pcs) and loaded with 20kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1).

Suspension tracks No. 7 and 8

Tracks are made of four consoles (WPCB1000) fixed to ceiling by throughbolt hot dip galvanized (R-XPT-HD – PSRO M10F) in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Track No. 7:

Cable trays (KFL300H60, height 60 mm, width 300 mm, steel sheet thickness 0,7 mm) fixed together by integrated junctions. Partition (PGL60) is fixed by screws (SGK M6x12) in distance of 100 mm of cable tray side. Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m^{-1} . Cables are not fixed to cable trays.

Track No. 8:

Cable mesh trays (KDSZ300H60, height 60 mm, width 300 mm, steel wire $\varnothing$ 4,5 mm) fixed together by integrated junctions. Partition (PGL50) is fixed by junctions (ZS/ZSO) in distance of 100 mm of mesh tray side. Mesh trays are fixed to supports by junctions (ZS/ZSO, 2 pcs) and loaded with 10kg.m^{-1} . Cables are fixed to mesh trays by cable clamps (UKZ1/UKZO1).

Suspension track No. 9

Track is made of four consoles (WPCB1000) fixed to ceiling in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable ladders (DFP300H60, height 60 mm, width 300 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by integrated junctions. Partition (PGDJ40) is fixed by nut bolts (SR M6x16) in distance of 100 mm of cable ladder side. Ladders are fixed to brackets by junctions (ZM/ZMO, 2 pcs) and nut bolts (SGK M8x14, 2 pcs) and loaded with 10kg.m^{-1} . Cables are fixed to ladders by cable clamps (UK1/UKO1).

Suspension tracks No. 10 and 11

Tracks are made of supports (CWP/CWOP40H40) fixed together by junction (LC40H40) and screws (SGK M10x20, 6 pcs). Supports are fixed to trapezoidal steel sheet on ceiling by hangers (WT/WT0120) and threaded rods (PG M8) in spacing of 1500 mm. Each track is additionally loaded at mid-length of span by weight (3,5kg) which represents illumination. Cables are laid inside the supports. Connection boxes PMO1 are fixed directly to supports.

Suspension tracks No. 12 and 13

Tracks are made of supports (CWP/CWOP40H40) fixed together by junction (LC40H40) and screws (SGK M10x20, 6 pcs). Supports are fixed to steel profile on ceiling by beam clamps (ZK8) and threaded rods (PG M8) in spacing of 1500 mm. Each track is additionally loaded at mid-length of span by weight (3,5kg) which represents illumination. Cables are laid inside the supports.

Suspension track No. 14

Track is made of four consoles combined of support (CWP/CWOP40H40) and two threaded rods (PG M10) fixed together by washers (PP10) and nuts (NS M10). Consoles are fixed to ceiling by ceiling hangers (US12) and throughbolt hot dip galvanized (R-XPT-HD – PSRO M10F) in spacing of 1200 mm.

Cable trays (KCP/KCOP300H60, height 60 mm, width 300 mm, steel sheet thickness 1,5 mm) fixed together by junctions (LPP/LPOPH60, 2 pcs) and screws (SGK M6x12, 8 pcs) on sides and by junction (BL/BLO300) and screws (SGK M6x12, 8 pcs) on the bottom. Trays are fixed to supports by screws (SGK M6x12, 2 pcs) and loaded with 10kg.m^{-1} .



Suspension track No. 15

Track is made of four consoles combined of support (CWP/CWOP40H40) and two threaded rods (PG M10) fixed together by washers (PP10) and nuts (NS M10). Consoles are fixed to ceiling in spacing of 1500 mm.

Cable tray (KGJ/KGOJ400H60, height 60 mm, width 400 mm, steel sheet thickness 0,9 mm) and cable ladder (DUP/DUOP400H60, height 60 mm, width 400 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) are fixed together by two junctions (LDC/LDOCH60) and nut bolts (SGK M8x14 and SGK M6x12) on sides and junction (BZK/BZKO400) and nut bolts (SGK M6x12) on the bottom. Loading of construction is 20kg.m^{-1} .

Suspension track No. 16

Track is made of supports (CWP/CWOP40H40) fixed to steel profiles on ceiling by clamps (UDC) and screws (SM M10x40) with channel nuts (NR M10) in spacing of 1500 mm.

Cable ladders (DUP/DUOP400H60, height 60 mm, width 400 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) fixed together by junctions (LDC/LDOCH60, 2 pcs) and nut bolts (SGK M8x14, 8 pcs) on sides. Ladders are fixed conversely to supports by brackets (UTM/UTMO) and nut bolts (SGK M8x14) and loaded with 20kg.m^{-1} .

Ceiling track No. 17

Track is made of cable clamps (KSA) fixed to ceiling in spacing of 600 mm. Five cables are fixed in one clamp at track no. 17a.

Ceiling track No. 18

Track is made of cable clamps (KSA) fixed to ceiling in spacing of 600 mm. Connection boxes PMO1 and PMO2 are fixed to ceiling.

Wall track No. 19

Tracks are made of two ladders (type DUP/DUOP400H60, length 1000 mm, steel sheet thickness 1,5 mm, spacing of transoms 300 mm) covered by fire boxes. Fire boxes with dimensions (520 x 300 x 230) mm, are made of boards R-FRBOARD-1-S (producer: Koelner) 50 mm thick covered by steel sheet 0,7 mm thick. Upper and bottom edge of fire boxes is closed by same type of board and cavity inside the box is filled with foam type RPP-B1 (producer: Koelner).

Ladders are fixed to wall by four consoles (UTM/UTMO fixed to ladders by screws SGK M8x14) by threaded rods (PG M8) in spacing of 600 mm. Boxes are fixed to wall by two threaded rods (type PG M8) with washers (PW8) and nuts (NS M8). Cables are fixed to ladders by cable clamps (UK1/UKO1) in spacing of 300 mm. Length of cables is 3,5 m.

Suspension track No. 14 a, b, c – tracks without cables

Construction 14a is made of four consoles combined of adjustable pedestal (PSU) and support steel profile fixed together by screws (SM M10x60) and washers (PP10). Support is reinforced in place of fixing with pedestal by spacer (BR40).

Construction 14b is made of four consoles (CMP40H22) and steel plate welded to it.

Construction 14c is made of two consoles combined of console (WPCW/WPCO) and steel profile welded to it.

Constructions represent fixing of illuminations.

All bearing systems were from steel, galvanized according to the Sendzimir method PN-EN 10327:2005. Loading with steel chain and line loads was used as the equivalent load.

More detailed information about construction of specimen 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 specimen. Parameters which were checked are quoted in paragraph 4.3.



4.2 DESCRIPTION OF THE SPECIMEN FIXATION

The test specimens were fixed on the ceiling of the test furnace which was created from concrete panels made of common shocked concrete of class B 16/20, 150 mm thick – 4 pieces and to side walls made of aerated concrete blocks YTONG, 250 mm thick.

Cable penetration through the wall of test furnace was sealed by mineral wool.

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

4.3 INSPECTION OF THE SPECIMEN

The conformity of the drawings and the test specimen was checked before and after the fire resistance test. It was possible to carry out this check on the test specimen. The specimen corresponded to the drawings which are part of this test report. The visual review of the test specimen, the used materials as well as the size verification (basic dimensions) and also the way of specimen fixation to supporting construction were subject of this inspection.

4.4 CLIMATIC CONDITIONING OF THE SPECIMEN

Test specimen was stored in the hall of testing laboratory and was conditioned according to EN 1363-1 under the following climatic conditions:

Ambient air temperature [°C]

mean	21,1
standard deviation	1,1

Relative air humidity [%]

mean	42,4
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 CONDITIONS OF THE TEST

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

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 record from the test.

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

Relative air humidity [%]	Ambient air temperature [°C]
43,9	22,7

5.2 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 Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	15	47 minutes
2	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
3	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM		90 minutes no failure / interruption
4	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE		33 minutes
5	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM	14	90 minutes no failure / interruption
6	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE		54 minutes
7	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO1	18	55 minutes
8	cable Flame-X 950 (N)HXH FE180/E90 4x6RE + connection boxes PMO1		90 minutes no failure / interruption
9	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO2		74 minutes
10	cable Flame-X 950 (N)HXH FE180/E90 4x6RE + connection boxes PMO2		90 minutes no failure / interruption
11	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE	13	34 minutes
12	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO1	10	31 minutes
13	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	9	90 minutes no failure / interruption
14	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		27 minutes
15	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	8	90 minutes no failure / interruption
16	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		39 minutes
17	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	7	90 minutes no failure / interruption
18	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		34 minutes
19	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	6	90 minutes no failure / interruption
20	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		51 minutes
21	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	5	29 minutes
22	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
23	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	4	90 minutes no failure / interruption
24	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		64 minutes
25	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	16	90 minutes no failure / interruption
26	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
27	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE		90 minutes no failure / interruption
28	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM		90 minutes no failure / interruption
29	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM	17d	90 minutes no failure / interruption
30	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		90 minutes no failure / interruption
31	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE	17c	77 minutes
32	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE	3	57 minutes
33	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM		90 minutes no failure / interruption
34	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM	2	90 minutes no failure / interruption
35	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE		61 minutes
36	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE	1	87 minutes
37	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM		90 minutes no failure / interruption
38	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	17b	90 minutes no failure / interruption
52	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	14	70 minutes
53	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	13	90 minutes no failure / interruption
54	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	12	90 minutes no failure / interruption



Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
55	cable Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90 + connection boxes PMO1	11	32 minutes
56	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	9	47 minutes
57	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	8	35 minutes
58	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	7	83 minutes
59	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	3	40 minutes
60	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	2	41 minutes
61	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	1	90 minutes no failure / interruption
62	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	17a	90 minutes no failure / interruption
63	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
64	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
65	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
66	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
67	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
68	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
69	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
70	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		90 minutes no failure / interruption
71	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		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.

7. DIRECT APPLICATION OF TEST RESULTS

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



Measured values inside the test furnace

Time t [min]	Temperature [°C]											Deviation d _e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	25,6	26,6	25,8	26,5	27,8	28,8	28,1	28,4	27,2	20,0	22,7	0,0	17,1
5	555,4	590,8	581,2	501,2	556,1	598,0	572,1	498,6	556,7	576,0	22,8	-13,1	17,6
10	712,5	696,3	686,5	602,0	716,4	721,3	702,7	632,9	683,8	678,0	22,8	-4,5	18,2
15	781,5	759,4	758,6	686,1	771,9	784,9	757,3	694,3	749,3	739,0	22,9	-2,4	18,3
20	810,8	814,7	820,3	755,5	790,0	822,6	826,3	788,6	803,6	781,0	22,9	-0,9	18,8
25	848,2	849,2	854,9	779,5	830,3	867,1	875,1	813,5	839,7	815,0	23,0	-0,1	19,8
30	873,4	894,3	913,0	846,2	858,6	919,9	916,8	870,0	886,5	842,0	23,0	0,7	18,1
35	911,9	898,8	915,1	868,2	870,6	917,7	924,6	889,9	899,6	865,0	23,1	1,4	17,6
40	902,8	885,5	907,0	874,2	872,5	914,0	915,5	881,8	894,2	885,0	23,1	1,6	18,2
45	886,4	898,5	912,6	889,4	864,8	898,3	899,6	869,0	889,8	902,0	23,2	1,2	19,4
50	881,7	902,0	900,1	898,1	853,0	876,9	882,6	862,2	882,1	918,0	23,2	0,8	17,3
55	889,7	909,8	927,4	910,7	861,9	904,0	922,5	886,4	901,6	932,0	23,3	0,2	19,6
60	904,5	926,2	940,4	947,3	879,8	921,1	939,0	935,0	924,2	945,0	23,3	0,0	17,2
65	960,8	958,3	966,9	971,9	926,5	958,9	969,7	955,8	958,6	957,0	23,4	-0,1	17,4
70	962,6	967,6	982,8	989,7	930,7	967,0	987,9	977,5	970,7	968,0	23,4	-0,1	19,6
75	967,0	978,0	991,4	990,9	939,3	978,1	999,7	984,9	978,7	979,0	23,5	-0,1	18,8
80	973,6	984,4	994,9	993,1	948,3	988,6	1006,9	988,9	984,8	988,0	23,6	-0,1	17,6
85	980,9	992,7	1006,8	1001,6	958,2	999,4	1017,8	1001,0	994,8	997,0	23,6	-0,1	18,2
90	996,1	1001,9	1019,5	1020,0	973,0	1013,1	1030,7	1021,5	1009,5	1006,0	23,6	-0,1	19,2
91	998,2	1006,6	1021,5	1021,5	973,9	1015,0	1033,1	1025,5	1011,9	1008,0	23,6	-0,1	19,3
92	1000,2	1009,3	1022,4	1023,7	976,7	1018,7	1036,0	1027,0	1014,3	1009,0	23,7	-0,1	18,9
93	1002,6	1012,0	1024,7	1025,6	979,2	1020,5	1037,7	1029,0	1016,4	1011,0	23,7	-0,1	18,2
94	1007,0	1015,1	1028,4	1026,9	981,7	1022,0	1040,2	1031,6	1019,1	1012,0	23,7	-0,1	19,3
95	1007,6	1017,0	1029,9	1027,4	983,4	1023,5	1041,3	1031,8	1020,2	1014,0	23,7	-0,1	19,3

Tave Average temperature in the test furnace calculated from plate thermometers

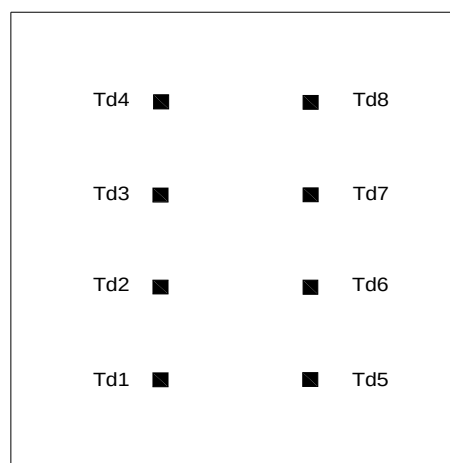
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

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

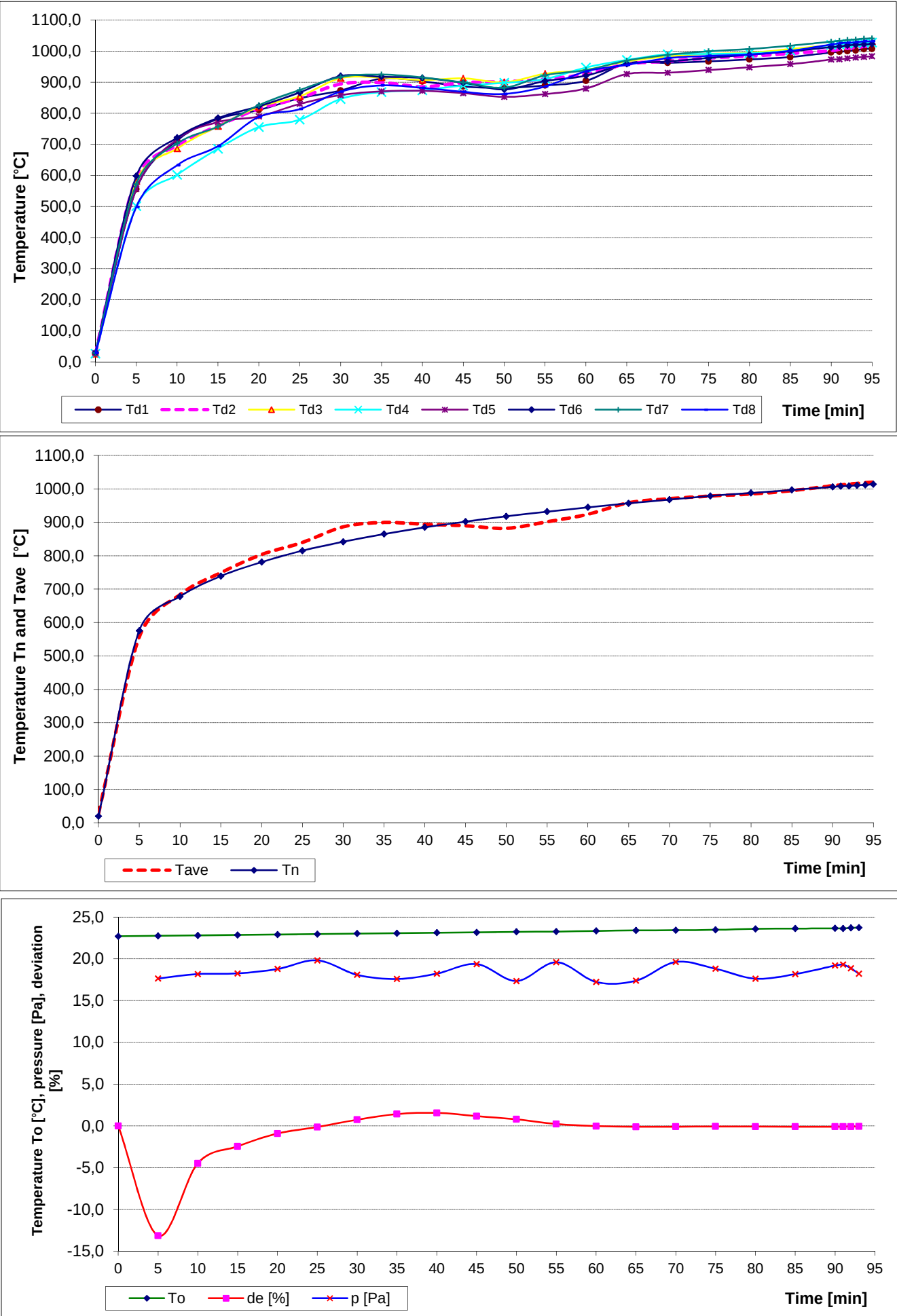
p Pressure inside the test furnace measured under the ceiling of the test furnace

Layout of measuring points inside the test furnace:





Measured values inside the test furnace /graph




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

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S1	1-L1	x
	2-L2	x
	3-L3	x
	4-PEN	47:30
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	no failure / interruption
	10-L2	no failure / interruption
	11-L3	no failure / interruption
	12-PEN	no failure / interruption
S4	13-L1	x
	14-L2	x
	15-L3	33:52
	16-PEN	33:52
S5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S6	21-L1	54:25
	22-L2	54:25
	23-L3	x
	24-PEN	x
S7	25-L1	x
	26-L2	x
	27-L3	x
	28-PEN	55:23
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S9	33-L1	x
	34-L2	74:20
	35-L3	x
	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 Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
2	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
3	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
4	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
5	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
6	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
7	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO1
8	cable Flame-X 950 (N)HXH FE180/E90 4x6RE + connection boxes PMO1
9	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO2
10	cable Flame-X 950 (N)HXH FE180/E90 4x6RE + connection boxes PMO2

- 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	x
	42-L2	x
	43-L3	x
	44-PEN	34:10
S12	45-L1	x
	46-L2	x
	47-L3	x
	48-PEN	31:03
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	x
	54-L2	x
	55-L3	27:23
	56-PEN	x
S15	57-L1	no failure / interruption
	58-L2	no failure / interruption
	59-L3	no failure / interruption
	60-PEN	no failure / interruption
S16	61-L1	x
	62-L2	x
	63-L3	x
	64-PEN	39:51
S17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
S18	69-L1	x
	70-L2	34:57
	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	x
	78-L2	x
	79-L3	51:12
	80-PEN	x

Specimen No.	Cables
11	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
12	cable Flame-X 950 (N)HXH FE180/E90 4x1,5RE + connection boxes PMO1
13	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
14	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
15	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
16	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
17	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
18	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
19	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
20	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5

- 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	x
	82-L2	x
	83-L3	x
	84-PEN	29:53
S22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	x
	94-L2	x
	95-L3	64:44
	96-PEN	x
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	no failure / interruption
	106-L2	no failure / interruption
	107-L3	no failure / interruption
	108-PEN	no failure / interruption
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	no failure / interruption
	118-L2	no failure / interruption
	119-L3	no failure / interruption
	120-PEN	no failure / interruption

Specimen No.	Cables
21	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
22	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
23	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
24	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
25	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5
26	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25
27	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
28	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
29	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
30	2 cables Flame-X 950 (N)HXCH FE180/E90 4x50RM/25

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


Measured time of tested specimens from S31 to S40 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	x
	122-L2	x
	123-L3	x
	124-PEN	77:12
S32	125-L1	x
	126-L2	x
	127-L3	57:29
	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	x
	138-L2	x
	139-L3	x
	140-PEN	61:28
S36	141-L1	x
	142-L2	x
	143-L3	87:27
	144-PEN	x
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption

Specimen No.	Cables
31	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
32	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
33	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
34	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
35	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
36	2 cables Flame-X 950 (N)HXH FE180/E90 4x1,5RE
37	2 cables Flame-X 950 (N)HXH FE180/E90 4x50RM
38	2 cables Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5

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


Measured time of tested specimen S52 to S61 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	71:31
	210-PEN	-
S52B	211-L	70:24
	212-PEN	-
S53	213-L	no failure / interruption
	214-PEN	no failure / interruption
	215-L	no failure / interruption
	216-PEN	no failure / interruption
S54	217-L	no failure / interruption
	218-PEN	no failure / interruption
	219-L	no failure / interruption
	220-PEN	no failure / interruption
S55A	221-L	32:56
	222-PEN	-
S55B	223-L	-
	224-PEN	-
S56A	225-L	67:41
	226-PEN	-
S56B	227-L	47:12
	228-PEN	-
S57A	229-L	49:32
	230-PEN	-
S57B	231-L	35:00
	232-PEN	-
S58A	233-L	85:47
	234-PEN	-
S58B	235-L	83:20
	236-PEN	-
S59A	237-L	40:28
	238-PEN	-
S59B	239-L	42:17
	240-PEN	-
S60A	241-L	41:52
	242-PEN	-
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 Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
53	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
54	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
55	cable Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90 + connection boxes PMO1
56	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
57	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
58	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
59	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
60	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90
61	2 cables Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90

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]
S62	249-L	no failure / interruption
	250-PEN	no failure / interruption
	251-L	no failure / interruption
	252-PEN	no failure / interruption
S63	253-L	no failure / interruption
	254-PEN	no failure / interruption
	255-L	no failure / interruption
	256-PEN	no failure / interruption
S64	257-L	no failure / interruption
	258-PEN	no failure / interruption
	259-L	no failure / interruption
	260-PEN	no failure / interruption
S65	261-L	no failure / interruption
	262-PEN	no failure / interruption
	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66	265-L	no failure / interruption
	266-PEN	no failure / interruption
	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67	269-L	no failure / interruption
	270-PEN	no failure / interruption
	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68	273-L	no failure / interruption
	274-PEN	no failure / interruption
	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69	277-L	no failure / interruption
	278-PEN	no failure / interruption
	279-L	no failure / interruption
	280-PEN	no failure / interruption
S70	281-L	no failure / interruption
	282-PEN	no failure / interruption
	283-L	no failure / interruption
	284-PEN	no failure / interruption
S71	285-L	no failure / interruption
	286-PEN	no failure / interruption
	287-L	no failure / interruption
	288-PEN	no failure / interruption

Specimen No.	Cables
62	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
63	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
64	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
65	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
66	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
67	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
68	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
69	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
70	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90
71	cable Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90

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.

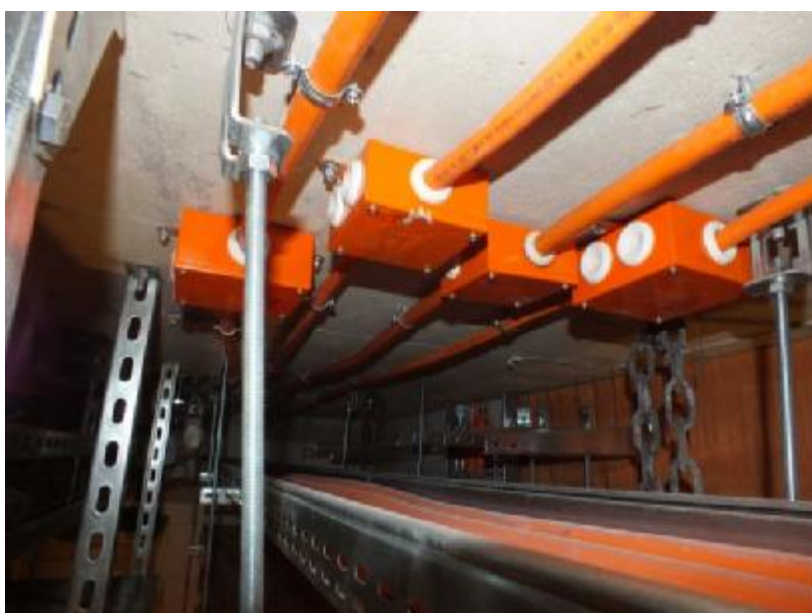


Photo taken before the test.



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

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12



Halogen-free low smoke fire resistant security power cables



CONSTRUCTION		
Conductors:	bare copper conductor, circular solid class 1 (RE) or stranded circular or circular compacted class 2 (RM) according to EN 60228	
Insulation:	special cross-linked halogen-free fire resistant silicone compound	
Inner covering:	special flame-retardant and halogen-free compound	
Sheath:	thermoplastic halogen-free compound type HM4 according to DIN VDE 0276-604	
Colour of sheath:	orange	
Core identification:	according to DIN VDE 0293-308, HD 308 S2 or EN 50334	
	(N)HXH-O FE180/E90 without protective conductor	(N)HXH-J FE180/E90 with protective conductor
1-core:	black	green-yellow
2-core:	blue, brown	-
3-core:	brown, black, grey	green-yellow, blue, brown
3-core*:	blue, brown, black	-
4-core:	blue, brown, black, grey	green-yellow, brown, black, grey
4-core*:		green-yellow, blue, brown, black
5-core:	blue, brown, black, grey, black	green-yellow, blue, brown, black, grey
more 5-core:	black with numbering	green-yellow, others cores black with numbering
*For certain applications only.		

CHARACTERISTIC	
Maximum conductor operating temperature:	+90°C
Lowest ambient temperature for fixed installation:	-30°C
Lowest installation temperature:	-5°C
Maximum short-circuit conductor temperature:	+250°C
Minimum bending radius:	15D - for single core cable; 12D - for multicore cable (D - overall cable diameter)
Maximum permissible tensile stress with cable grip for Cu:	50 N/mm ²

TELE-FONIKA Kable Sp. z o.o. S.K.A.
www.tfkable.com



CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

FIRE PERFORMANCE

Insulation integrity FE 180:	DIN VDE 0472-814 (800 °C, 180 min.), IEC 60331-21
System integrity E90:	DIN 4102-12 (90 min.)
Flame propagation:	DIN EN 50266-2-2, VDE 0482-266-2-2, IEC 60332-3-22
Smoke density:	DIN EN 61034-2, VDE 0482-1034-2, IEC 61034-2
Gases evolved during combustion:	DIN EN 50267-2-2, VDE 0482-267-2-2, IEC 60754-2: pH ≥ 4,3; conductivity ≤ 10 μSmm ⁻¹

APPLICATIONS

Fire resistant security cables for installation everywhere where high safety requirements have a special significance e.g., in industrial complexes, power stations, public buildings, hotels, underground railway systems, hospitals etc.

Standard length cable packing	500 or 1000m on drums. Other forms of packing and delivery are available on request
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APPROVALS

SIQ, GOST, VDE

Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
1x1,5RE	6,4	58	12,1
1x2,5RE	6,7	70	7,41
1x4RE	7,2	88	4,61
1x6RE	7,7	110	3,08
1x10RE	8,5	153	1,83
1x16RE	9,4	213	1,15
1x16RM	9,8	221	1,15
1x25RM	11,5	326	0,727
1x35RM	12,6	424	0,524
1x50RM	14,3	561	0,387
1x70RM	15,6	761	0,268
1x95RM	18,4	1050	0,193
1x120RM	20,0	1295	0,153
1x150RM	22,0	1582	0,124
1x185RM	24,1	1961	0,0991
1x240RM	27,2	2529	0,0754
1x300RM	29,6	3140	0,0601

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CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12



Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
2x1,5RE	11,5	187	12,1
2x2,5RE	12,3	224	7,41
2x4RE	13,2	274	4,61
2x6RE	14,2	336	3,08
2x10RE	15,8	454	1,83
2x16RE	17,6	613	1,15
2x16RM	18,4	651	1,15
2x25RM	21,8	952	0,727
3x1,5RE	12,1	210	12,1
3x2,5RE	12,9	255	7,41
3x4RE	13,9	319	4,61
3x6RE	14,9	398	3,08
3x10RE	16,6	550	1,83
3x16RE	18,6	758	1,15
3x16RM	19,5	799	1,15
3x25RM	23,1	1179	0,727
3x35RM	25,4	1524	0,524
3x50RM	29,3	2038	0,387
3x70RM	32,6	2757	0,268
3x95RM	38,3	3799	0,193
3x120RM	41,5	4641	0,153
3x150RM	46,5	5756	0,124
3x185RM	50,8	7077	0,0991
3x240RM	59,8	9351	0,0754

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CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
4x1,5RE	13,0	243	12,1
4x2,5RE	13,9	299	7,41
4x4RE	15,0	379	4,61
4x6RE	16,2	478	3,08
4x10RE	18,1	670	1,83
4x16RE	20,3	934	1,15
4x16RM	21,3	982	1,15
4x25RM	25,4	1459	0,727
4x35RM	27,9	1912	0,524
4x50RM	32,6	2595	0,387
4x70RM	36,1	3502	0,268
4x95RM	42,9	4874	0,193
4x120RM	46,4	5959	0,153
4x150RM	51,8	7349	0,124
4x185RM	56,6	9046	0,0991
4x240RM	64,0	11670	0,0754
5x1,5RE	14,0	287	12,1
5x2,5RE	15,0	356	7,41
5x4RE	16,3	455	4,61
5x6RE	17,6	577	3,08
5x10RE	19,7	815	1,83
5x16RE	22,2	1144	1,15
5x16RM	23,3	1202	1,15
5x25RM	27,9	1796	0,727
5x35RM	31,1	2368	0,524
5x50RM	36,1	3189	0,387
5x70RM	40,0	4314	0,268
5x95RM	47,4	5997	0,193
5x120RM	51,6	7366	0,153
5x150RM	57,4	9056	0,124
5x185RM	62,9	11184	0,0991
5x240RM	71,3	14468	0,0754
7x1,5RE	15,1	341	12,1
7x2,5RE	16,2	430	7,41
7x4RE	17,6	559	4,61
7x4RM	18,5	596	4,61

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CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
10x1,5RE	18,6	475	12,1
10x1,5RM	19,4	503	12,1
10x2,5RE	20,2	604	7,41
10x2,5RM	21,2	644	7,41
12x1,5RE	19,2	524	12,1
12x1,5RM	20,0	555	12,1
12x2,5RE	20,8	672	7,41
12x2,5RM	21,8	715	7,41
14x1,5RE	20,1	582	12,1
14x1,5RM	21,0	617	12,1
14x2,5RE	21,8	752	7,41
14x2,5RM	22,9	800	7,41
16x1,5RE	21,1	650	12,1
16x1,5RM	22,1	689	12,1
16x2,5RE	22,9	843	7,41
16x2,5RM	24,1	897	7,41
19x1,5RE	22,2	729	12,1
19x1,5RM	23,2	772	12,1
19x2,5RE	24,1	951	7,41
19x2,5RM	25,4	1012	7,41
20x1,5RE	23,3	803	12,1
20x1,5RM	24,3	853	12,1
24x1,5RE	25,8	910	12,1
24x1,5RM	27,0	965	12,1
24x2,5RE	28,2	1204	7,41
24x2,5RM	29,7	1282	7,41
30x1,5RE	27,2	1066	12,1
30x1,5RM	28,5	1130	12,1
30x2,5RE	30,1	1440	7,41
30x2,5RM	31,7	1531	7,41

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CABLES

FLAME-X 950
(N)HXH FE180/E90
0,6/1kV

DIN VDE 0266, DIN 4102-12



Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
37x1,5RE	29,7	1292	12,1
37x1,5RM	31,1	1369	12,1
3x25RM/16RM	24,3	1355	0,725/1,15
3x35RM/16RM	26,2	1711	0,524/1,16
3x50RM/25RM	30,5	2326	0,387/0,725
3x70RM/35RM	33,9	3142	0,268/0,524
3x95RM/50RM	40,0	4344	0,193/0,387
3x120RM/70RM	43,7	5413	0,153/0,268
3x150RM/70RM	47,6	6484	0,124/0,268
3x185RM/95RM	52,9	8115	0,0991/0,193
3x240RM/120RM	59,4	10410	0,0754/0,153

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CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12



Current ratings as defined in DIN VDE 0276-604, HD 604 S1-5G and DIN VDE 0276-627, HD 627 S1-7H

Operating temperature at conductor 90°C

Ambient air temperature 30°C

Installation: single multicore cable and three single core cables

Installation	1)			
Number of loaded cores		1	3	3
Cross-section, mm ²		Current ratings in Ampere (A)		
1.5		33	24	26
2.5		43	32	34
4		57	42	44
6		72	53	56
10		99	74	77
16		131	98	102
25		177	133	138
35		217	162	170
50		265	197	207
70		336	250	263
95		415	308	325
120		485	359	380
150		557	412	437
185		646	475	507
240		774	564	604
300		901	649	697

¹⁾ Rated current for direct current systems with a far-distanced return conductor.

Current ratings for control cables – DIN VDE 0276-627, HD 627 S1-7H:

Conversion factors for multicore cable (≥ 5 cores)

The conversion factors are to be used for laying the cables in air (col. 3), to the values given in above tables

Number of loaded cores	Laying in air
5	0,75
7	0,65
10	0,55
14	0,50
19	0,45
24	0,40
40	0,35
61	0,30

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CABLES

FLAME-X 950

(N)HXH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

Current ratings - DIN VDE 0298-4 and IEC 60364-5-523

Ambient temperature: 30°C

Conductor operating temperature: 90°C

Installation: in free air for fixed installation within buildings: in walls, on wall, ladder or cable trays

Installation method ¹	A2		B2		C		E	
	Multicore cables in insulating tubes, in thermally insulated walls		Multicore cables in insulating tubes on a wall		Single- or multicore cables on a wall		Multicore cables with a space of minimum 0,3 x diameter d to wall	
Number of loaded cores	2	3	2	3	2	3	2	3
Cross-section mm ²	Current ratings in Ampere (A)							
1,5	18,5	16,5	22	19,5	24	22	26	23
2,5	25	22	30	26	33	30	36	32
4	33	30	40	35	45	40	49	42
6	42	38	51	44	58	52	63	54
10	57	51	69	60	80	71	86	75
16	76	68	91	80	107	96	115	100
25	99	89	119	105	138	119	149	127
35	121	109	146	128	171	147	185	158
50	145	130	175	154	209	179	225	192
70	183	164	221	194	269	229	289	246
95	220	197	265	233	328	278	352	298
120	253	227	305	268	382	322	410	346
150	290	259	—	—	441	371	473	399
185	329	295	—	—	506	424	542	456
240	386	346	—	—	599	500	641	538
Table	52-C2	52-C4	52-C2	52-C4	52-C2	52-C4	52-C11	52-C11

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FLAME-X 950

(N)HXH FE180/E90

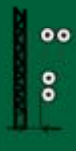
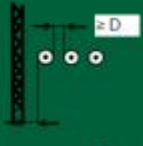
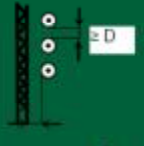
0,6/1kV

DIN VDE 0266, DIN 4102-12

**Current ratings for single core sheathed cables in free air.**

Ambient temperature 30°C, conductor operating temperature 90°C

Single core sheathed cables with a space of minimum 1 x diameter (D) to wall.

Installation method	F Touching			G Spaced	
	 ≥ D	 ≥ D	 ≥ D	 ≥ D	 ≥ D
Number of loaded cores	2	3	3	3	3
Cross-section /mm ² /	Current ratings in Ampere (A)				
25	161	141	135	182	161
35	200	176	169	226	201
50	242	216	207	275	246
70	310	279	268	353	318
95	377	342	328	430	389
120	437	400	383	500	454
150	504	464	444	577	527
185	575	533	510	661	605
240	679	634	607	781	719
300	783	736	703	902	833
Table	52-C11	52-C11	52-C11	52-C11	52-C11

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FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12

TF
Kable

**Halogen- free low smoke fire resistant security power cables
with copper concentric conductor**



CONSTRUCTION

Conductors:	bare copper conductor, circular solid class 1 (RE) or stranded circular or circular compacted class 2 (RM) according to EN 60228
Insulation:	special cross-linked halogen-free fire resistant silicone compound
Inner covering:	special flame-retardant and halogen-free compound
Concentric conductor:	inner layer - round copper wires, outer layer - copper tape
Separator:	tape
Sheath:	thermoplastic halogen- free compound type HM4 according to DIN VDE 0276-604
Colour of sheath:	orange
Core identification:	according to DIN VDE 0293-308, HD 308 S2 or EN 50334
	2-core: blue, brown
	3-core: brown, black, grey
	3-core*: blue, brown, black
	4-core: blue, brown, black, grey
	5-core: blue, brown, black, grey, black
	more 5-core: black with numbering

*For certain applications only.

CHARACTERISTIC

Maximum conductor operating temperature:	+90°C
Lowest ambient temperature for fixed installation:	-30°C
Lowest installation temperature:	-5°C
Maximum short-circuit conductor temperature:	+250°C
Minimum bending radius:	12D - for multicore cable (D - overall cable diameter)
Maximum permissible tensile stress with cable grip for Cu:	50 N/mm ²

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FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12



FIRE PERFORMANCE

Insulation integrity FE 180:	DIN VDE 0472-814 (800°C, 180 min.), IEC 60331-21
System integrity E90:	DIN 4102-12 (90 min.)
Flame propagation:	DIN EN 50266-2-2, VDE 0482-266-2-2, IEC 60332-3-22
Smoke density:	DIN EN 61034-2, VDE 0482-1034-2, IEC 61034-2
Gases evolved during combustion:	DIN EN 50267-2-2, VDE 0482-267-2-2, IEC 60754-2: pH ≥ 4,3; conductivity ≤ 10 μSmm ⁻¹

APPLICATIONS

Fire resistant security cables for installation everywhere where high safety requirements have a special significance e.g., in industrial complexes, power stations, public buildings, hotels, underground railway systems, hospitals etc.

Standard length cable packing	500 or 1000m on drums. Other forms of packing and delivery are available on request
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APPROVALS

SIQ, GOST, VDE, CNBOP

Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
2x1,5RE/1,5	13,8	261	12,1/12,1
2x2,5RE/2,5	14,6	302	7,41/7,41
2x4RE/4	15,9	378	4,61/4,61
2x6RE/6	17,2	462	3,08/3,08
2x10RE/10	18,9	623	1,83/1,83
2x16RE/16	21,2	850	1,15/1,15
2x16RM/16	22,0	891	1,15/115
2x25RM/16	25,4	1154	0,727/1,15
3x1,5RE/1,5	14,4	287	12,1/12,1
3x2,5RE/2,5	15,2	336	7,41/7,41
3x4RE/4	16,6	425	4,61/4,61
3x6RE/6	17,9	526	3,08/3,08
3x10RE/10	19,7	720	1,83/1,83
3x16RE/16	22,2	999	1,15/1,15
3x16RM/16	23,1	1044	1,15/115
3x25RM/16	26,7	1393	0,727/1,15
3x35RM/16	29,0	1739	0,524/1,15
3x50RM/25	32,9	2339	0,387/0,727
3x70RM/35	36,5	3172	0,268/0,524
3x95RM/50	42,4	4364	0,193/0,387

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CABLES

FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

3x120RM/70	46,3	5404	0,153/0,268
3x150RM/70	51,3	6513	0,124/0,268
3x185RM/95	55,8	8071	0,0991/0,193
3x240RM/120	63,7	10423	0,0754/0,153
4x1,5RE/1,5	15,3	325	12,1/12,1
4x2,5RE/2,5	16,2	384	7,41/7,41
4x4RE/4	17,7	489	4,61/4,61
4x6RE/6	19,2	611	3,08/3,08
4x10RE/10	21,2	848	1,83/1,83
4x16RE/16	23,9	1183	1,15/1,15
4x16RM/16	24,9	1232	1,15/115
4x25RM/16	29,0	1682	0,727/1,15
4x35RM/16	31,5	2136	0,524/1,15
4x50RM/25	36,4	2924	0,387/0,727
4x70RM/35	40,0	3933	0,268/0,524
4x95RM/50	46,6	5415	0,193/0,387
4x120RM/70	51,2	6744	0,153/0,268
4x150RM/70	56,6	8135	0,124/0,268
4x185RM/95	62,0	10132	0,0991/0,193
4x240RM/120	70,3	13013	0,0754/0,153
5x1,5RE/1,5	16,3	371	12,1/12,1
5x2,5RE/2,5	17,3	445	7,41/7,41
5x4RE/4	19,0	570	4,61/4,61
5x6RE/6	20,6	716	3,08/3,08
5x10RE/10	22,8	1000	1,83/1,83
5x16RE/16	25,8	1397	1,15/1,15
5x16RM/16	26,9	1461	1,15/115
5x25RM/16	31,5	2026	0,727/1,15
5x35RM/16	33,9	2581	0,524/1,15
5x50RM/25	39,9	3531	0,387/0,727
5x70RM/35	43,9	4760	0,268/0,524
5x95RM/50	51,5	6600	0,193/0,387
5x120RM/70	56,4	8174	0,153/0,268
5x150RM/70	62,8	9953	0,124/0,268
5x185RM/95	68,1	12273	0,0991/0,193
5x240RM/120	77,4	15810	0,0754/0,153
7x1,5RE/2,5	17,4	431	12,1/7,41
7x2,5RE/2,5	18,5	523	7,41/7,41
7x4RE/4	20,3	679	4,61/4,61
7x4RM/4	21,2	720	4,61/4,61

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CABLES

FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV

DIN VDE 0266, DIN 4102-12



Number and cross-sectional area of conductor	Approximate overall diameter	Approximate net weight of cables	Maximum conductor resistance at temperature 20°C
n x mm ²	mm	kg/km	Ω/km
10x1,5RE/2,5	20,9	578	12,1/7,41
10x1,5RM/2,5	21,7	617	12,1/7,41
10x2,5RE/4	22,8	739	7,41/4,61
10x2,5RM/4	23,8	781	7,41/4,61
12x1,5RE/2,5	21,5	637	12,1/7,41
12x1,5RM/2,5	22,3	672	12,1/7,41
12x2,5RE/4	23,4	810	7,41/4,61
12x2,5RM/4	24,4	854	7,41/4,61
14x1,5RE/2,5	22,4	699	12,1/7,41
14x1,5RM/2,5	23,3	738	12,1/7,41
14x2,5RE/6	24,5	903	7,41/3,08
14x2,5RM/6	25,6	955	7,41/3,08
16x1,5RE/4	23,7	789	12,1/4,61
16x1,5RM/4	24,7	830	12,1/4,61
16x2,5RE/6	25,6	998	7,41/3,08
16x2,5RM/6	26,8	1057	7,41/3,08
19x1,5RE/4	24,8	870	12,1/4,61
19x1,5RM/4	25,8	917	12,1/4,61
19x2,5RE/6	26,8	1112	7,41/3,08
19x2,5RM/6	28,1	1178	7,41/3,08
20x1,5RE/6	26,0	960	12,1/3,08
20x1,5RM/6	27,0	1014	12,1/3,08
24x1,5RE/6	28,5	1078	12,1/3,08
24x1,5RM/6	29,7	1138	12,1/3,08
24x2,5RE/10	31,3	1423	7,41/1,83
24x2,5RM/10	32,4	1513	7,41/1,83
30x1,5RE/6	29,9	1240	12,1/3,08
30x1,5RM/6	31,2	1310	12,1/3,08
30x2,5RE/10	32,6	1655	7,41/1,83
30x2,5RM/10	34,2	1752	7,41/1,83
37x1,5RE/10	32,2	1506	12,1/1,83
37x1,5RM/10	33,6	1588	12,1/1,83

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CABLES

FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

Current ratings as defined in DIN VDE 0276-604, HD 604 S1-5G and DIN VDE 0276-627, HD 627 S1-7H

Operating temperature at conductor 90°C

Ambient air temperature 30°C

Installation: single multicore cable and three single core cables

Installation			
Number of loaded cores	3		3
	laying in air*		
Cross-section, mm ²	Current ratings in Ampere (A)		
1.5	25		27
2.5	33		36
4	43		47
6	54		59
10	75		81
16	100		109
25	136		146
35	165		179
50	201		218
70	255		275
95	314		336
120	364		388
150	416		438
185	480		501
240	565		580
300	-		654

Current ratings for control cables – DIN VDE 0276-627, HD 627 S1-7H:

Conversion factors for multicore cable (≥ 5 cores)

The conversion factors are to be used for laying the cables in air (col. 3), to the values given in above tables

Number of loaded cores	Laying in air
5	0,75
7	0,65
10	0,55
14	0,50
19	0,45
24	0,40
40	0,35
61	0,30

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CABLES

FLAME-X 950

(N)HXCH FE180/E90

0,6/1kV



DIN VDE 0266, DIN 4102-12

Current ratings - DIN VDE 0298-4 and IEC 60364-5-523

Ambient temperature: 30°C

Conductor operating temperature: 90°C

Installation: in free air for fixed installation within buildings: in walls, on wall, ladder or cable trays

Installation method ¹	A2		B2		C		E	
	Multicore cables in insulating tubes, in thermally insulated walls		Multicore cables in insulating tubes on a wall		Single- or multicore cables on a wall		Multicore cables with a space of minimum 0,3 x diameter d to wall	
Number of loaded cores	2	3	2	3	2	3	2	3
Cross-section mm ²	Current ratings in Ampere (A)							
1,5	18,5	16,5	22	19,5	24	22	26	23
2,5	25	22	30	26	33	30	36	32
4	33	30	40	35	45	40	49	42
6	42	38	51	44	58	52	63	54
10	57	51	69	60	80	71	86	75
16	76	68	91	80	107	96	115	100
25	99	89	119	105	138	119	149	127
35	121	109	146	128	171	147	185	158
50	145	130	175	154	209	179	225	192
70	183	164	221	194	269	229	289	246
95	220	197	265	233	328	278	352	298
120	253	227	305	268	382	322	410	346
150	290	259	—	—	441	371	473	399
185	329	295	—	—	506	424	542	456
240	386	346	—	—	599	500	641	538
Table	52-C2	52-C4	52-C2	52-C4	52-C2	52-C4	52-C11	52-C11

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CABLES

FLAME-X 950

(N)HXCH FE180/E90

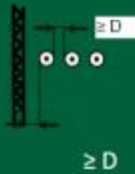
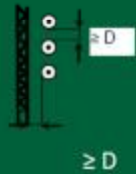
0,6/1kV

DIN VDE 0266, DIN 4102-12

**Current ratings for single core sheathed cables in free air.**

Ambient temperature 30°C, conductor operating temperature 90°C

Single core sheathed cables with a space of minimum 1 x diameter (D) to wall.

Installation method	F Touching			G Spaced	
					
Number of loaded cores	2	3	3	3	3
Cross-section /mm ² /	Current ratings in Ampere (A)				
25	161	141	135	182	161
35	200	176	169	226	201
50	242	216	207	275	246
70	310	279	268	353	318
95	377	342	328	430	389
120	437	400	383	500	454
150	504	464	444	577	527
185	575	533	510	661	605
240	679	634	607	781	719
300	783	736	703	902	833
Table	52-C11	52-C11	52-C11	52-C11	52-C11

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CABLES

FLAME-X⁹⁵⁰ JE-H(St)H...Bd FE180/E90

Based on DIN VDE 0815

Halogen-free low smoke fire resistant wiring cables for telecommunication and data processing systems



FIRE PERFORMANCE

Insulation integrity FE 180:	DIN VDE 0472-814 (800°C, 180 minutes), IEC 60331
System integrity E90:	DIN 4102-12 (90 min.)
Flame propagation:	DIN EN 60332-3-24, VDE 0482-332-3-24
Smoke density:	VDE 0482-1034-2, DIN EN 61034-2, IEC 61034-2
Gases evolved during combustion:	VDE 0482-267-2-2, DIN EN 50267-2-2, IEC 60754-2: pH ≥ 3,5; conductivity ≤ 10 µS/mm

CONSTRUCTION

Conductors:	bare solid copper conductor 0,8 mm
Insulation:	special core insulation with mica tape and halogen-free cross-linked compound according to EN 50290-2-26 (70°C)
Pair:	two cores twisted to pair and each 4 pairs consist to unit
Separator:	polyester tape
Screen:	aluminium/polyester laminated tape and solid copper drain wire
Drain wire:	solid tinned annealed copper wire 0,8 mm
Sheath:	thermoplastic halogen-free, flame retardant compound according to EN 50290-2-27 (70°C)

CHARACTERISTIC

Colour of sheath:	grey, orange or red		
Identification of pairs:	Pair no.	a-wire	b-wire
	1	blue	red
	2	grey	yellow
	3	green	brown
	4	white	black

Two-pair cables shall be cabled in quad formation and colour coded: blue, yellow, red, grey

Operating voltage:	peak voltage max. 225V (not for purposes of high current and power installation)
Loop resistance:	maximum 73,2 Ω/km
Insulation resistance at temperature 20°C:	minimum 100 MΩ x km
Mutual capacitance:	maximum 120 nF/km at 800 Hz (this values may be extended at 20% with a make-up up to 4 pairs)
Capacitance unbalance:	maximum 200 pF/100 m at 800 Hz (20% of the values, but one value up to 400 pF is allowed)
Test voltage 50 Hz:	core/core – 500V; core/screen – 2000V
Temperature range:	flexing: - 5°C to + 50°C, fixed installation- 30°C to + 70°C
Minimum bending radius:	6D (D – overall cable diameter)

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CABLES

**JE-H(St)H...Bd FE180/E90**

Based on DIN VDE 0815

Application:

Fire resistant, halogen-free static screened installation cables for telecommunication purpose. The static screen prevents strong interference impulse. Suitable for fixed installation everywhere, where in case of fire human life and material assets are to be protected, e.g. in industrial complexes, public buildings, hotels, airports, underground railway networks, hospitals. Not for purposes of high current and power installation.

Standard packing:

500 m on drums. Other forms of packing and delivery are available on request.

Number pairs and diameter of conductor	Approximate overall diameter	Approximate net weight of cable
n x 2 x mm	mm	kg/km
1 x 2 x 0,8	7,5	65
2 x 2 x 0,8	8,0	87
4 x 2 x 0,8	11,7	148



DRAWINGS

No	No FIRES	Cable type	Position	Description of construction, loading, ...
1	61	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	1	Cable trays KFL300H60 + partition PGL60 1.5 m /20kg/m / steel thickness 0,7 mm Construction: Supports CWP40H22/05, threaded rods PGM10.
2		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
3	37	Flame-X 950 (N)HXH FE180/E90 4x50RM		
4		Flame-X 950 (N)HXH FE180/E90 4x50RM		
5	36	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
6		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
7	35	Flame-X 950 (N)HXH FE180/E90 4x1,5RE	2	Cable mesh trays KDSZ400H60 + partition PGL50 1.5 m /20kg/m. Construction: Supports CWP40H22/05, threaded rods PGM10.
8		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
9	34	Flame-X 950 (N)HXH FE180/E90 4x50RM		
10		Flame-X 950 (N)HXH FE180/E90 4x50RM		
11	60	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
12		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
13	59	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	3	Cable ladders DFP400H60 + partition PGDJ40 1.5 m /20kg/m. Construction: Supports CWP40H22/05, threaded rods PGM10.
14		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
15	33	Flame-X 950 (N)HXH FE180/E90 4x50RM		
16		Flame-X 950 (N)HXH FE180/E90 4x50RM		
17	32	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
18		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
19	24	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	4	Cable trays KFL300H60 + partition PGL60 1.5 m /20kg/m / steel thickness 0,7 mm Construction: Supports CWP40H22/05, threaded rods PGM10
20		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
21	23	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
22		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
23	22	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	5	Cable mesh trays KDSZ400H60 + partition PGL50 1.5 m /20kg/m. Construction: Supports CWP40H22/05, threaded rods PGM10
24		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
25	21	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
26		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
27	20	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	6	Cable ladders DFP400H60 + partition PGDJ40 1.5 m /20kg/m. Construction: Supports CWP40H22/05, threaded rods PGM10
28		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
29	19	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
30		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
31	58	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	7	Cable trays KFL300H60 + partition PGL60 1.5 m /10kg/m / steel thickness 0,7 mm Construction: Consoles WPCB / brackets WWS/WWSO300
32		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
33	18	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
34		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
35	17	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
36		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
37	16	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	8	Cable mesh trays KDSZ300H60 + partition PGL50 1.5 m /10kg/m. Construction: Consoles WPCB / brackets WWS/WWSO300
38		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
39	15	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
40		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
41	57	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
42		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		

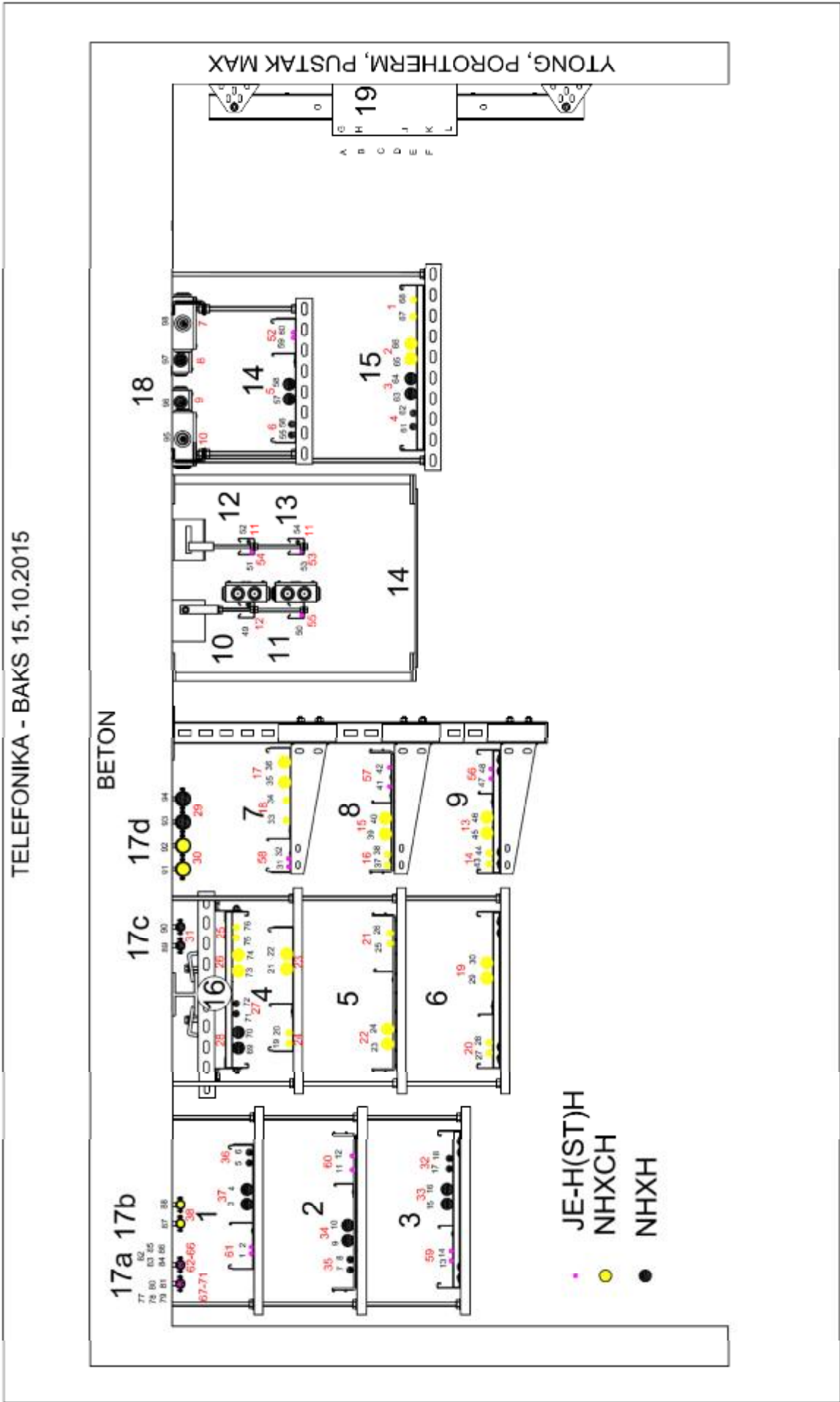


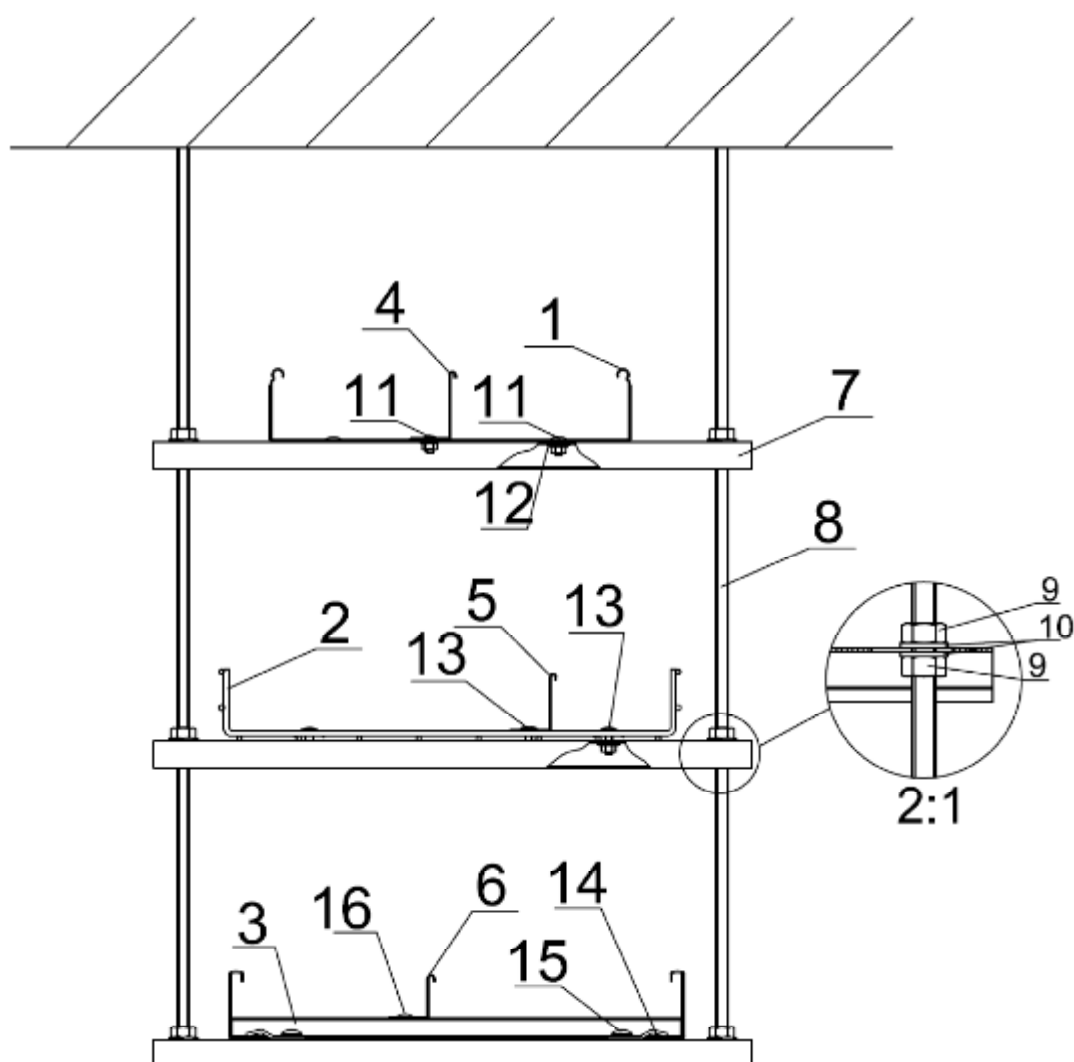
DRAWINGS

No	No FIRES	Cable type	Position	Description of construction, loading, ...
43	14	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	9	Cable ladders DFP300H60 + partition PGDJ40 1.5 m /10kg/m. Construction: Consoles WPCB / brackets WWS/WWSO300
44		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
45	13	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
46		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
47	56	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
48		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
49	12	Flame-X 950 (N)HXH FE180/E90 4x1,5RE	10	Connection boxes PM01. Supports CWOP, threaded rods M8 to trapezoidal steel sheet in spacing of 1500 mm. Additional loading 3,5 kg represent light.
50	55	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90	11	Connection boxes PM01. Supports CWOP threaded rods M8 to trapezoidal steel sheet in spacing of 1500 mm. Additional loading 3,5 kg represent light.
51	54	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	12	Cable laid in supports CWOP, threaded rods M8 to steel profiles in spacing of 1500 mm. Additional loading 3,5 kg represent light.
52	11	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
53	53	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	13	Cable laid in supports CWOP, threaded rods M8 to steel profiles in spacing of 1500 mm. Additional loading 3,5 kg represent light.
54	11	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
55	6	Flame-X 950 (N)HXH FE180/E90 4x1,5RE	14	Cable trays KCP/KCOP300H60 + partition PGL60 1.2 m /10kg/m / steel thickness 1,5 mm Construction: Supports CWP/CWOP40H40/05, threaded rods PGM10, ceiling hanger US12/USO12 + construction for fixing of lights
56		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
57	5	Flame-X 950 (N)HXH FE180/E90 4x50RM		
58		Flame-X 950 (N)HXH FE180/E90 4x50RM		
59	52	Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
60		Flame-X 950 Je-H(St)H 1x2x0,8 Bd FE180/E90		
61	4	Flame-X 950 (N)HXH FE180/E90 4x1,5RE	15	Cable trays KGJ/KGOJ400H60 + cable ladders DUP/DUOP by connectors LDC/LDOCH60 1.5 m /20kg/m. Construction: Supports CWP/CWOP40H40/05, threaded rods PGM10
62		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
63	3	Flame-X 950 (N)HXH FE180/E90 4x50RM		
64		Flame-X 950 (N)HXH FE180/E90 4x50RM		
65	2	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
66		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
67	1	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
68		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
69	28	Flame-X 950 (N)HXH FE180/E90 4x50RM	16	Cable ladders DUP400H 60 fixed conversely + partition PGDJ40 / 1.5 m / 20kg/m / steel thickness 1,2 mm Construction: Fixing to steel profiles on ceiling by UTM + CWOP40H40 + UDC + SRM
70		Flame-X 950 (N)HXH FE180/E90 4x50RM		
71	27	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
72		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
73	26	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
74		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
75	25	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
76		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
77	71	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90	17a	5 cables at 2 cable clamps KSA. Fixing in spacing of 600 mm.
78	70	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
79	69	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
80	68	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
81	67	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
82	66	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
83	65	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
84	64	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
85	63	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		
86	62	Flame-X 950 Je-H(St)H 2x2x0,8 Bd FE180/E90		

**DRAWINGS**

No	No FIRES	Cable type	Position	Description of construction, loading, ...
87	38	Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5	17b	2 cables at cable clamp KSA. Fixing in spacing of 600 mm.
88		Flame-X 950 (N)HXCH FE180/E90 4x1,5RE/1,5		
89	31	Flame-X 950 (N)HXH FE180/E90 4x1,5RE	17c	2 cables at cable clamp KSA. Fixing in spacing of 600 mm.
90		Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
91	30	Flame-X 950 (N)HXCH FE180/E90 4x50RM/25	17d	4 cables at cable clamp KSA. Fixing in spacing of 600 mm.
92		Flame-X 950 (N)HXCH FE180/E90 4x50RM/25		
93	29	Flame-X 950 (N)HXH FE180/E90 4x50RM		
94		Flame-X 950 (N)HXH FE180/E90 4x50RM		
95	10	Flame-X 950 (N)HXH FE180/E90 4x6RE	18	Connection boxes PMO2, PMO1 - Double connectors
96	9	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		
97	8	Flame-X 950 (N)HXH FE180/E90 4x6RE		
98	7	Flame-X 950 (N)HXH FE180/E90 4x1,5RE		

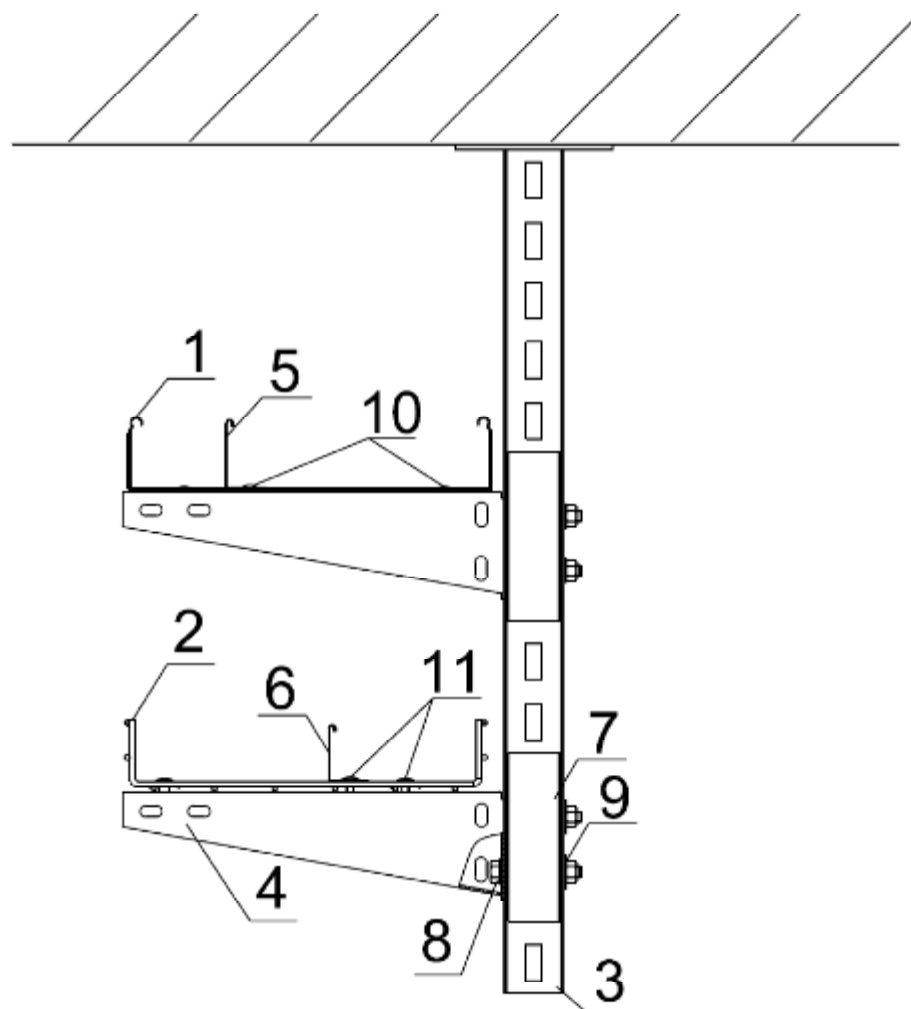




16	Śruba (kpl.)	SRM6x16	
15	Śruba z łbem grzybkowym	SGKM8x14	2
14	Zacisk mocujący	ZM/ZMO	2
13	Zacisk śrubowy	ZS/ZSO	2
12	Podkładka powiększona	PW6	2
11	Śruba z łbem grzybkowym	SGKM6X12	2
10	Podkładka	PP10	12
9	Nakrętka sześciokątna	NSM10	12
8	Pręt gwintowny	PGM10/...	2
7	Ceownik wzmocniony	CWP40H22/...	3
6	Przegroda	PGDJ40/...N	1
5	Przegroda	PGL50/...N	1
4	Przegroda	PGL60/...N	1
3	Drabina kablowa	DFP400H60/...N	1
2	Koryto siatkowe	KDSZ400H60/...	1
1	Koryto	KFL300H60/...N	1
L.p.	Nazwa	Symbol	Szt.



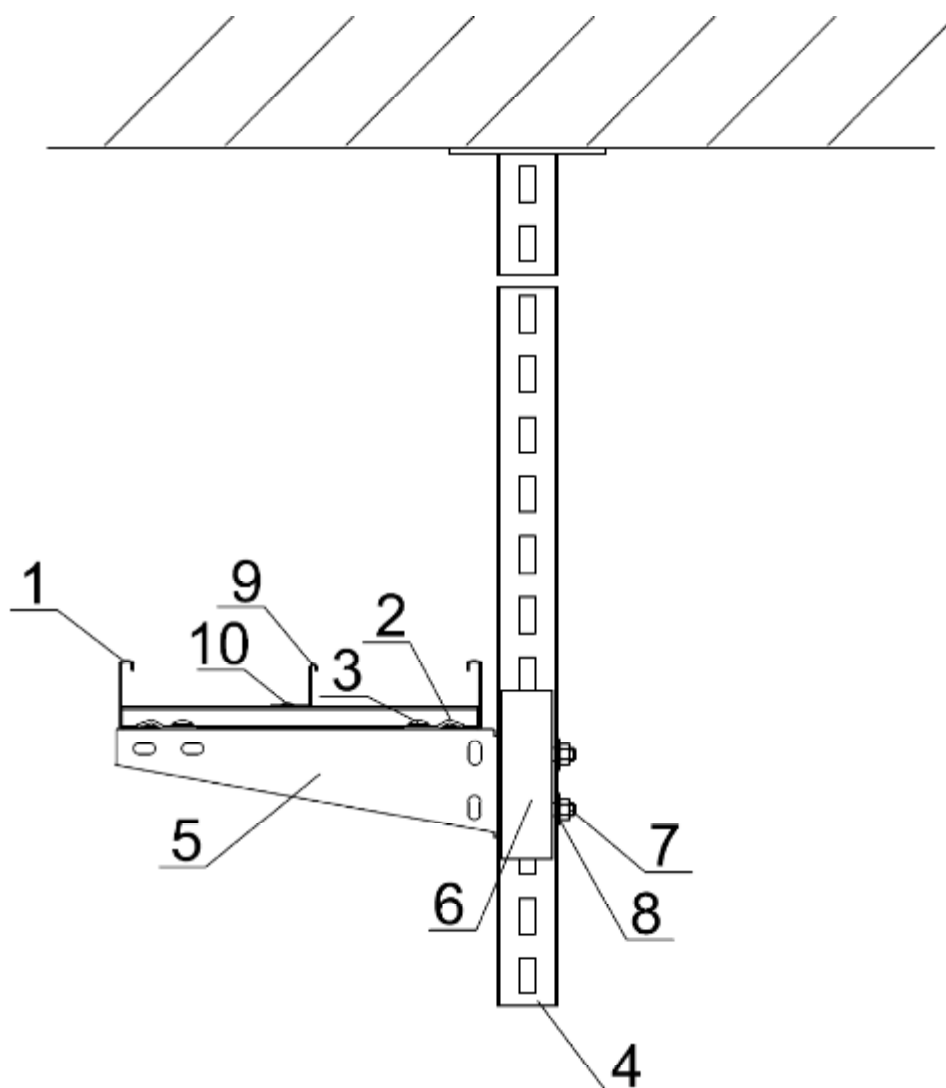
DRAWINGS



11	Zacisk śrubowy	ZS/ZSO	2
10	Śruba z łbem grzybkowym	SGKM6x12	2
9	Podkładka	PW10	4
8	Śruba (kpl.)	SMM10x70	4
7	Blacha rozporowa	BR55	2
6	Przegroda	PGL50/...N	1
5	Przegroda	PGL60/...N	1
4	Wysięgnik wzmocniony	WWS/WWSO300	2
3	Wspornik sufitowy	WPCB...	1
2	Koryto siatkowe	KDSZ300H60/...	1
1	Koryto	KFL300H60/...	1
L.p.	Nazwa	Symbol	Szt.



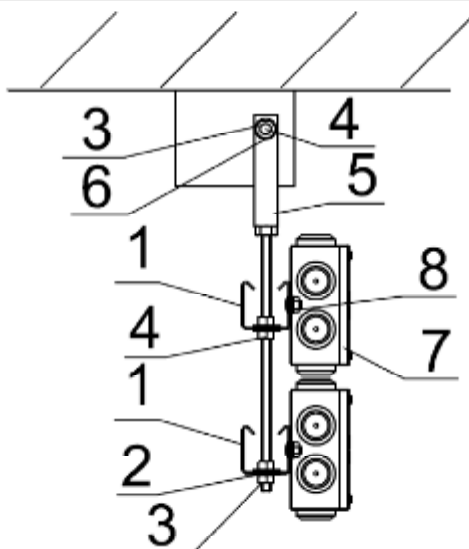
DRAWINGS



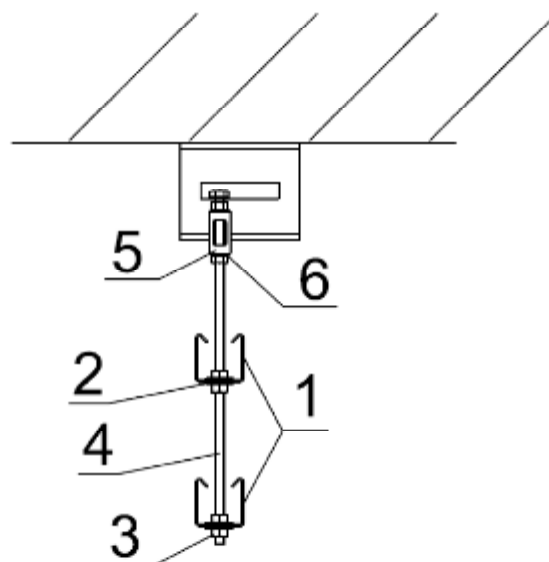
10	Śruba	SRM6x16	1
9	Przegroda	PGDJ40/...	1
8	Podkładka	PW10	2
7	Śruba (kpl.)	SMM10x70	2
6	Błacha rozporowa	BR55	1
5	Wysięgnik wzmocniony	WWS/WWSO300	1
4	Wspornik sufitowy	WPCB...	1
3	Śruba z łbem grzybkowym	SGKM8x14	2
2	Zacisk mocujący	ZM/ZMO	2
1	Drabina	DFP300H60/...	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS



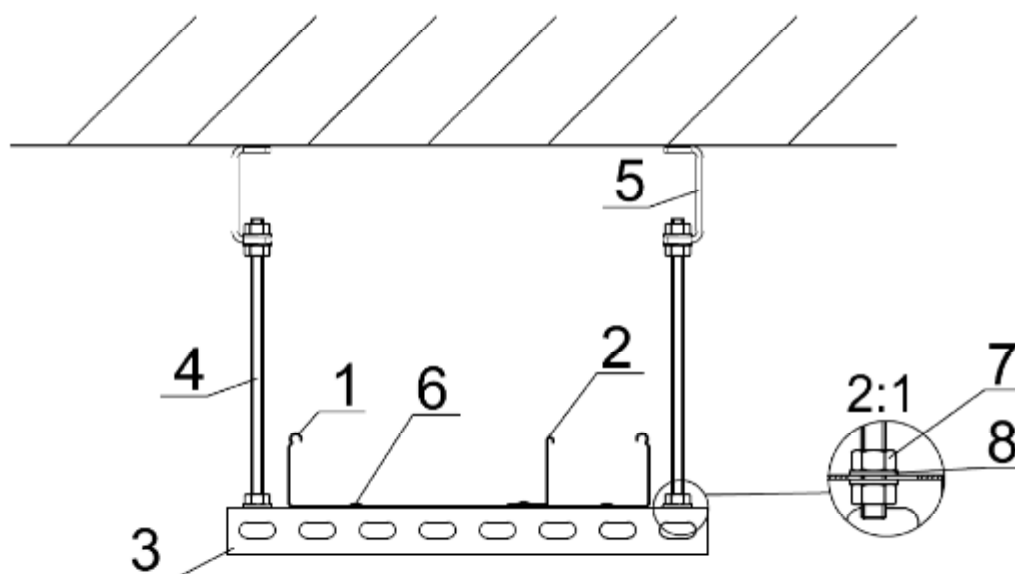
8	Śruba z łbem grzybkowym	SGKM6x12	
7	Puszka	PMO1	
6	Podkładka	PP8	1
5	Wieszak trapezowy	WT/WTO120M8	1
4	Pręt gwintowny	PGM8/...	2
3	Nakrętka	NSM8	7
2	Podkładka	PW8	4
1	Ceownik wzmacniony	CWP/CWOP40H40/...	2
L.p.	Nazwa	Symbol	Szt.



6	Podkładka	PP8	2
5	Zacisk	ZK8/19	1
4	Pręt gwintowny	PGM8/...	1
3	Nakrętka	NSM8	6
2	Podkładka	PW8	4
1	Ceownik wzmacniony	CWP/CWOP40H40/...	2
L.p.	Nazwa	Symbol	Szt.



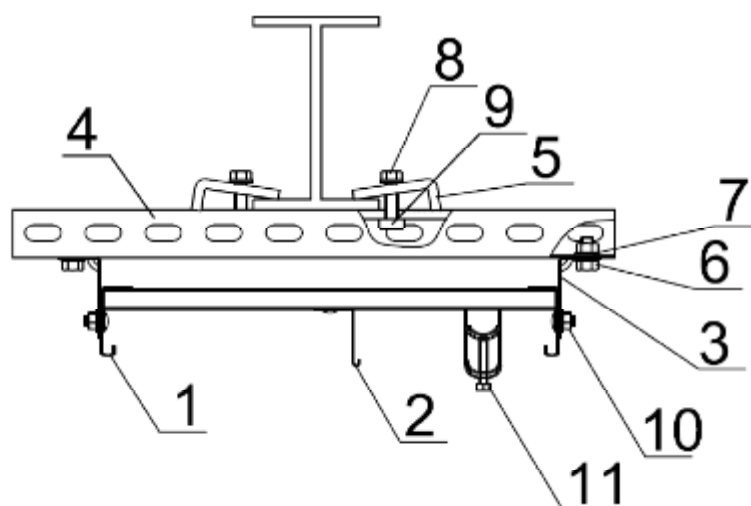
DRAWINGS



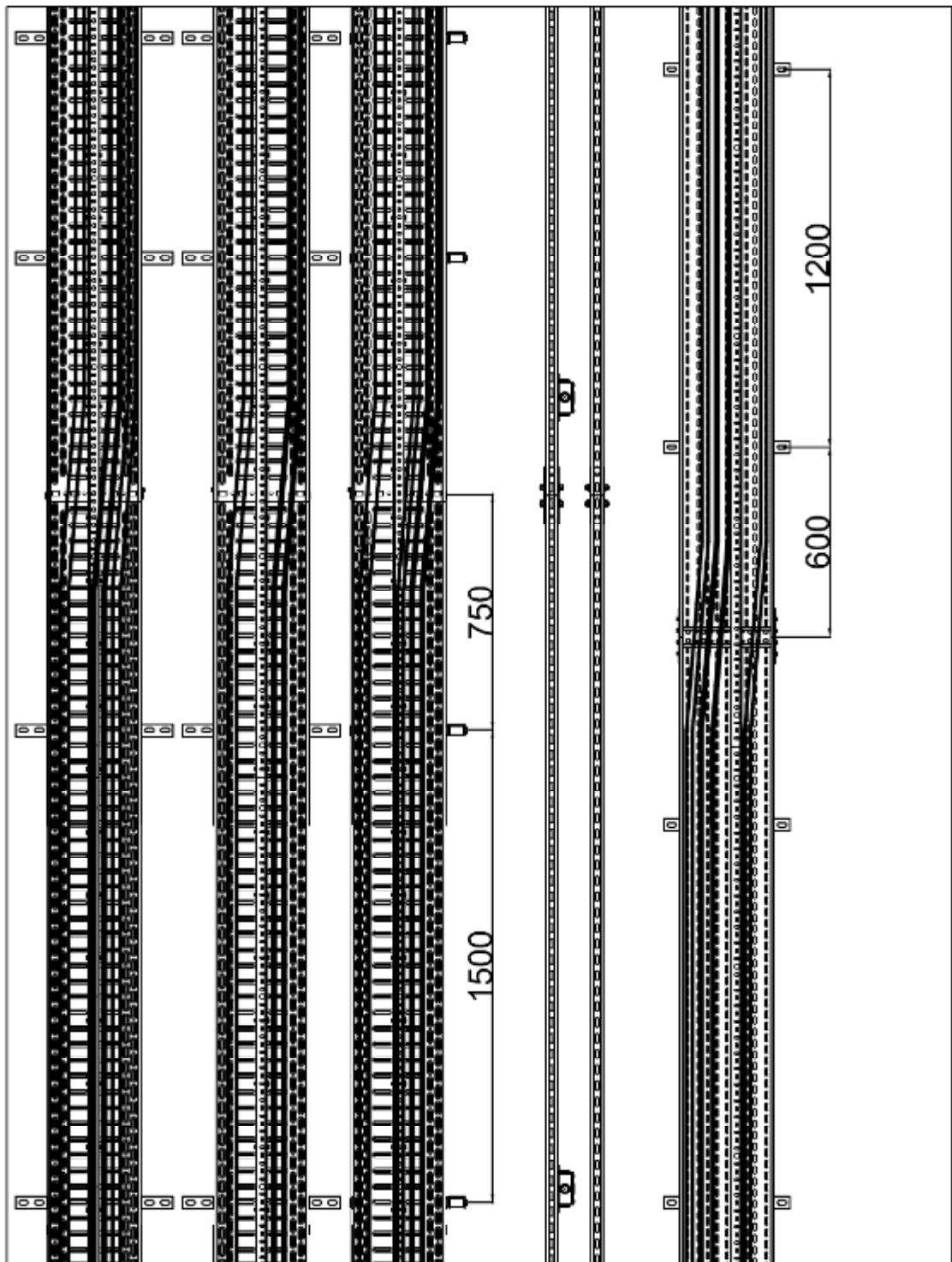
8	Podkładka	PP10	8
7	Nakrętka	NSM10	8
6	Śruba z łbem grzybkowym	SGKM6x12	2
5	Uchwyt sufitowy	US12/USO12	2
4	Pret gwintowany	PGM10/...	2
3	Ceownik wzmocniony	CWP/CWOP40H40/...	1
2	Przegroda	PGJ60/...	1
1	Koryto	KCP/KCOP300H60	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS



11	Uchwyt kablowy	UK1/UKO1...	
10	Śruba z łbem grzybkowym	SGKM8x14	2
9	Nakrętka rombowa	NRM10	2
8	Śruba	SMM10x40	2
7	Podkładka	PP10	2
6	Śruba (kpl.)	SMM10x20	2
5	Uchwyt dociskowy	UDC	2
4	Ceownik wzmacniony	CWP/CWOP40H40/...	1
3	Uchwyt trójkątny	UTM/UTMO	2
2	Przegroda	PGDJ40/...	1
1	Drabina	DUP400H60/...	1
L.p.	Nazwa	Symbol	Szt.

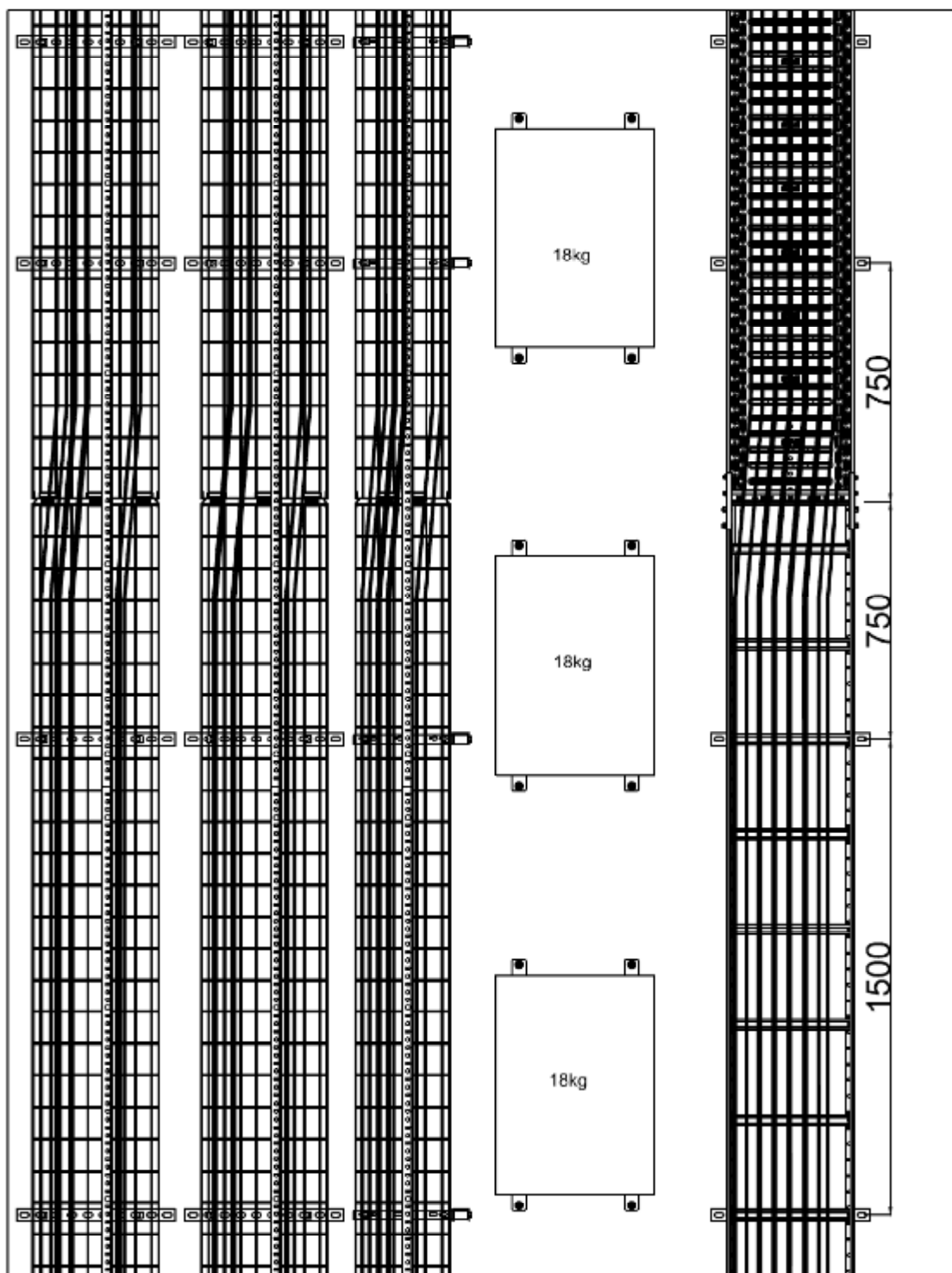


A-A

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DRAWINGS

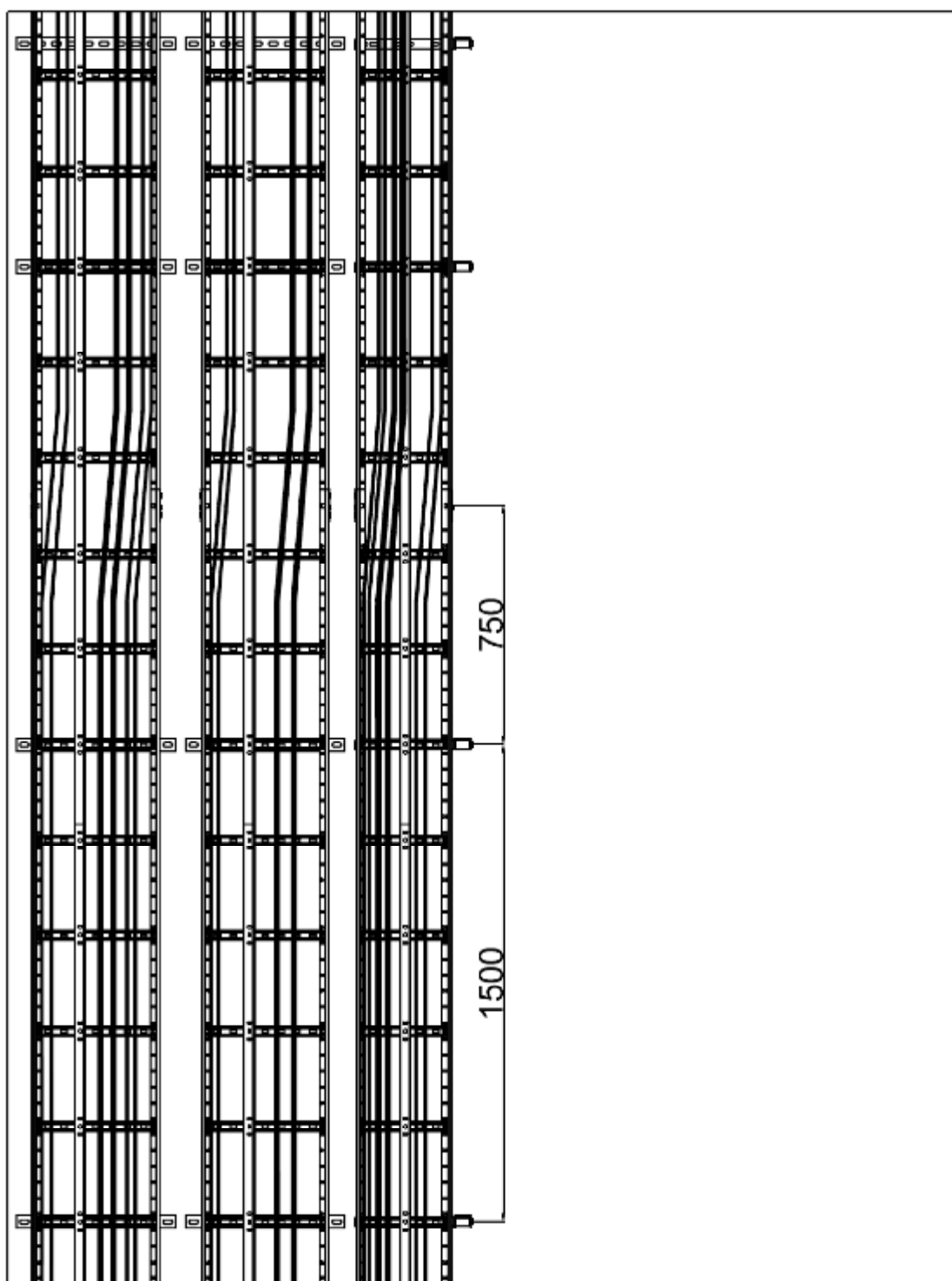


B-B

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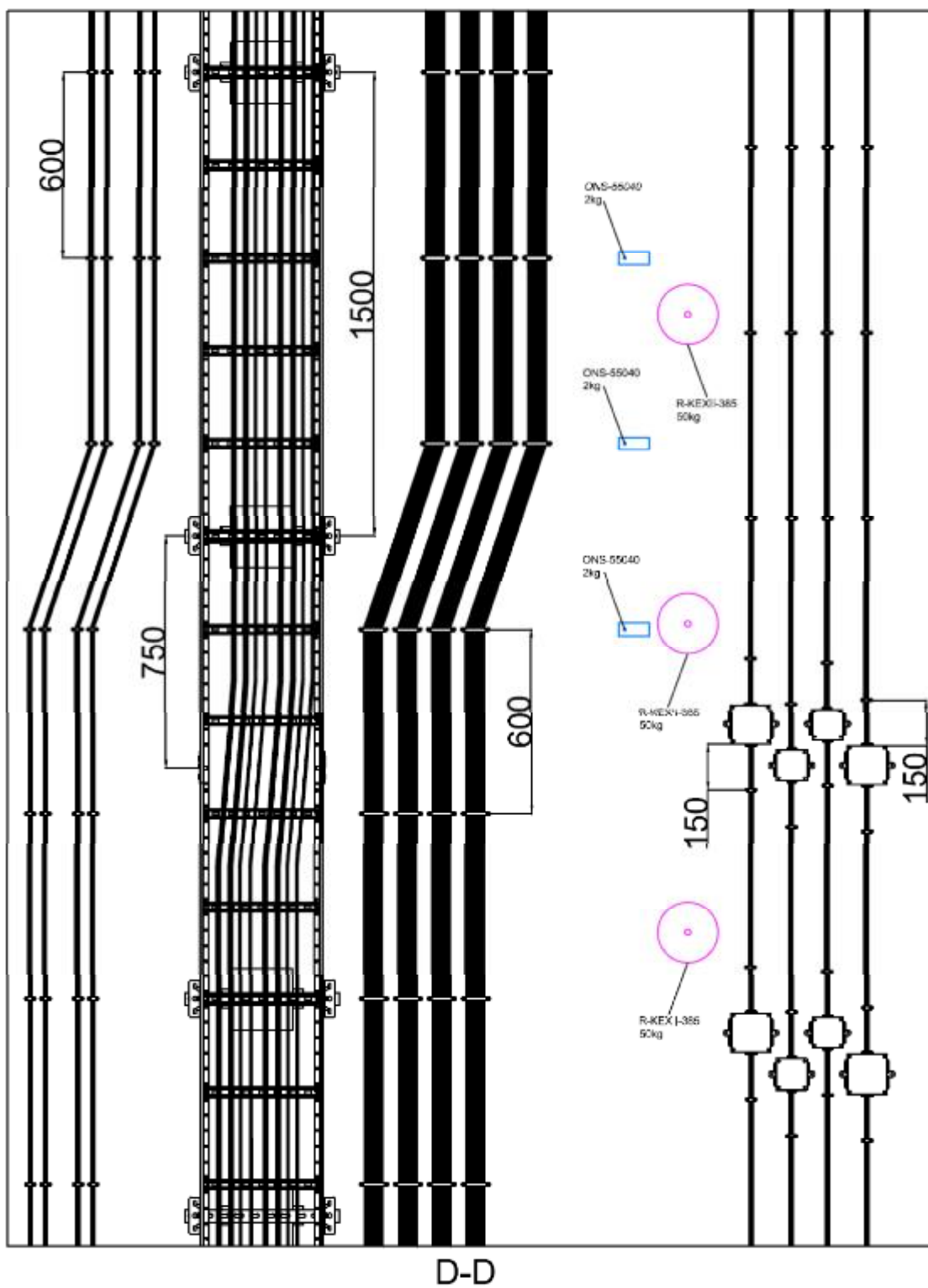


DRAWINGS

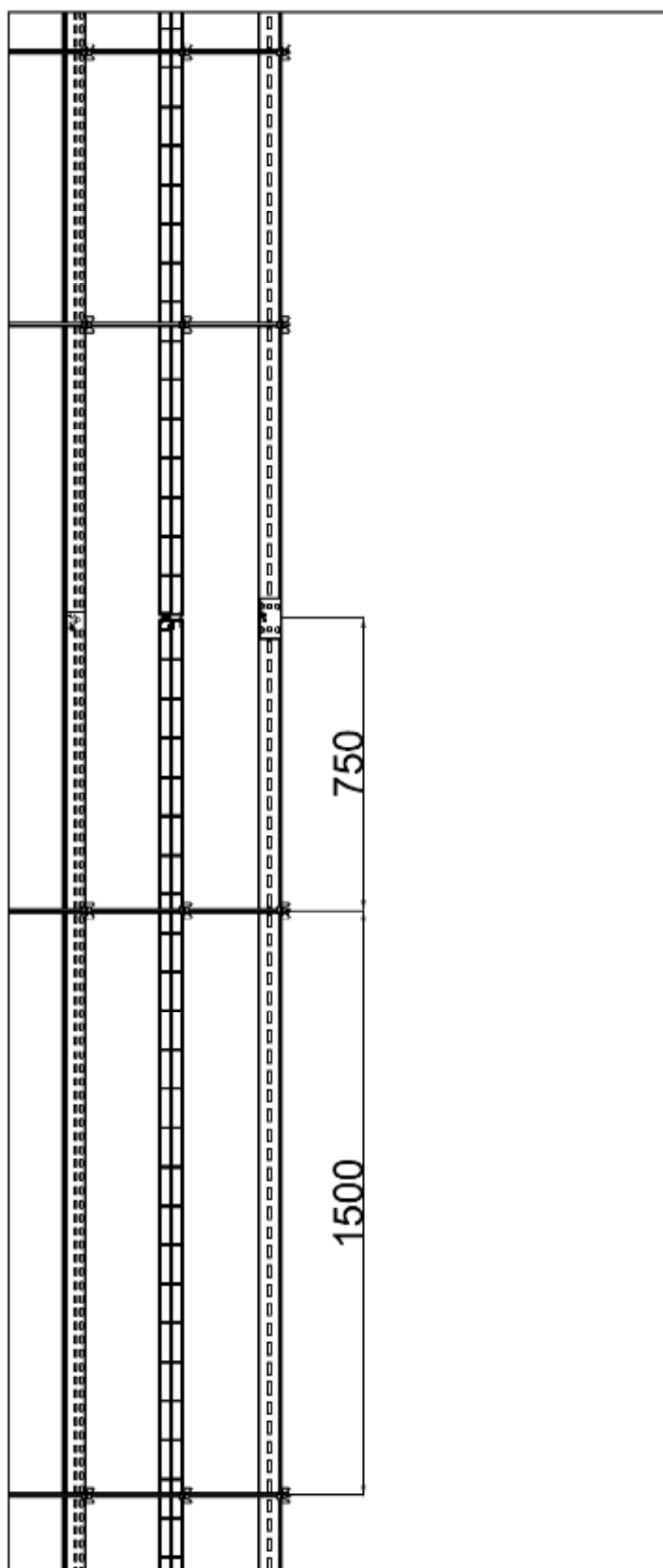


C-C

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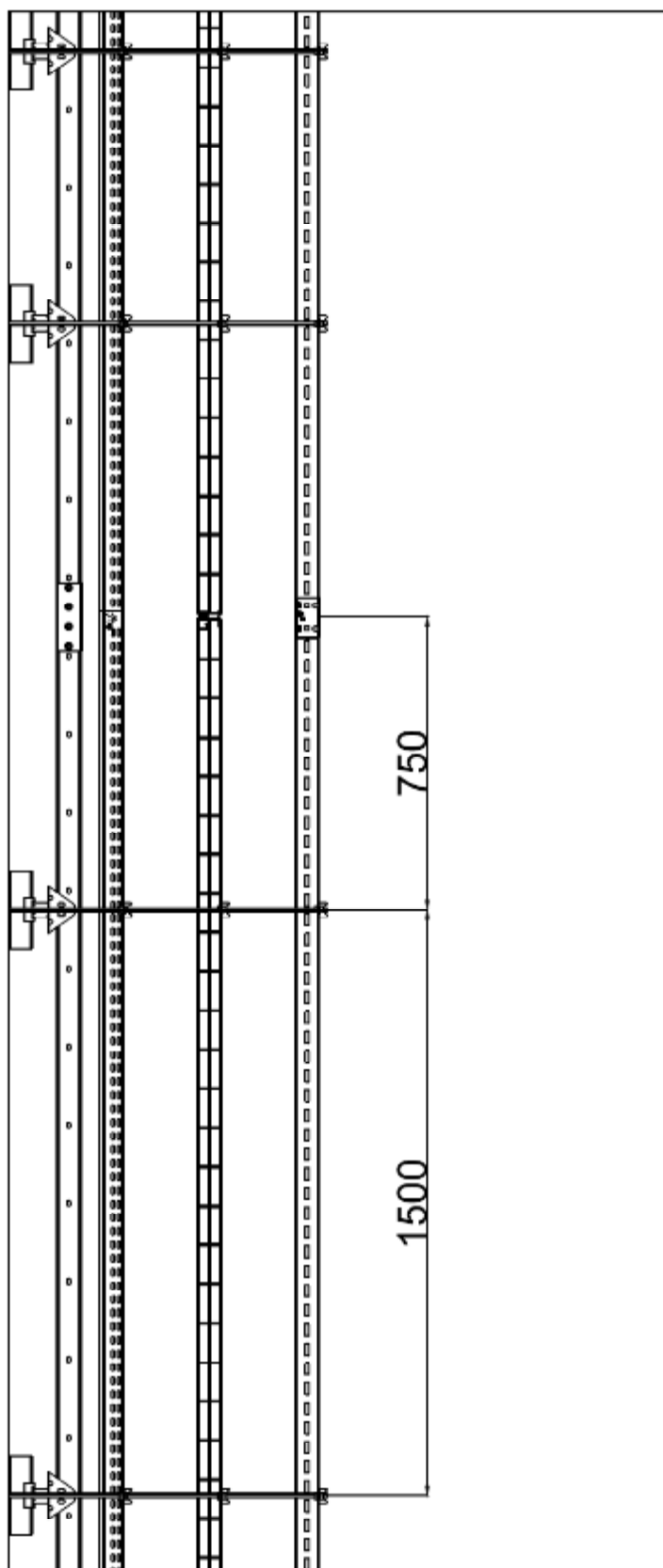


TELEFONIKA - BAKS 15.10.2015



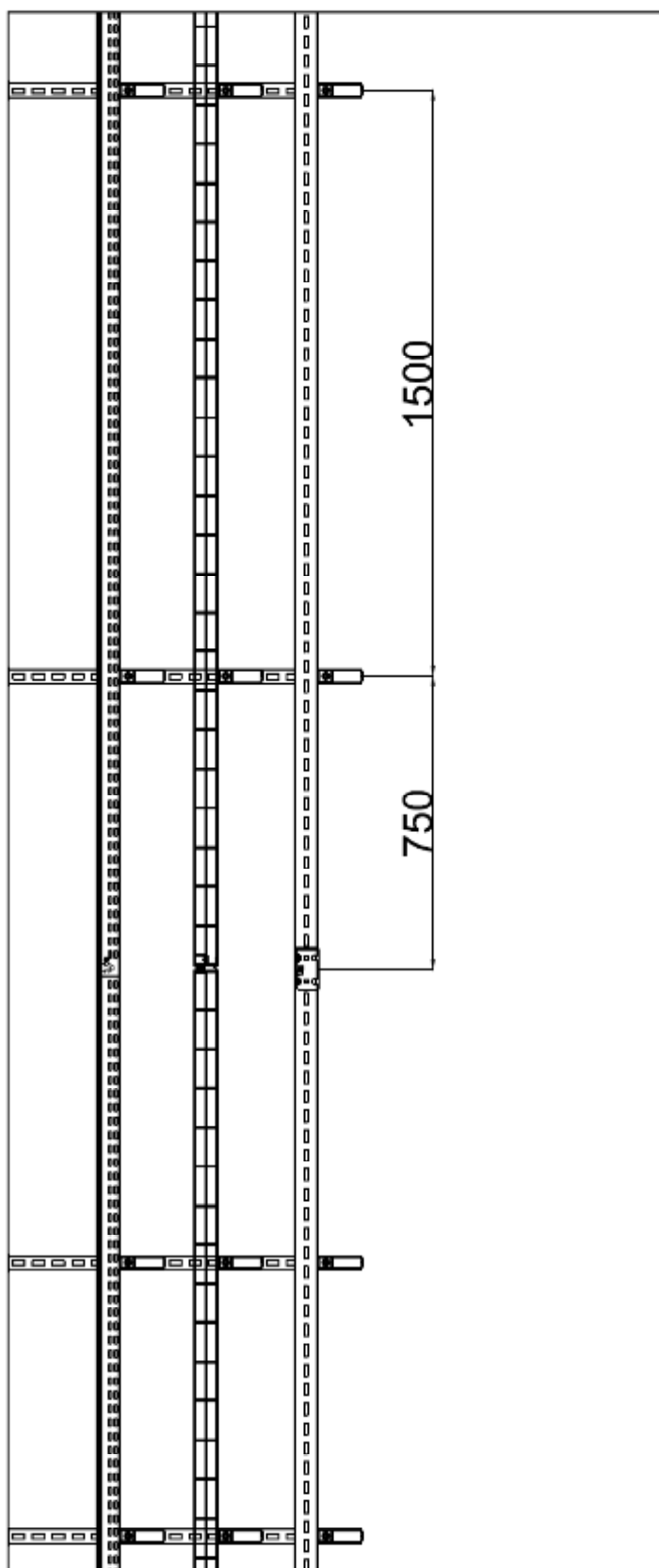
E-E

TELEFONIKA - BAKS 15.10.2015



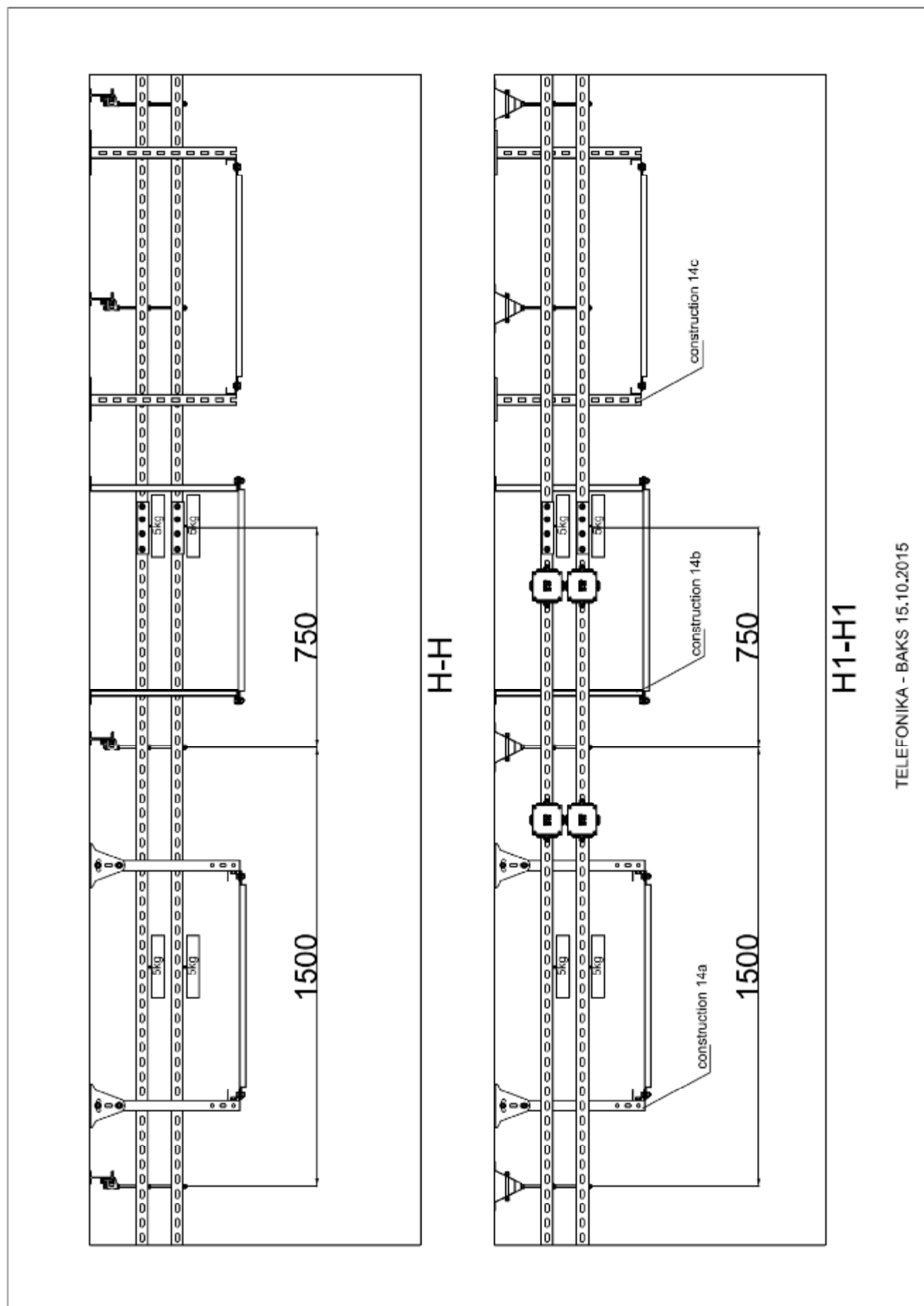
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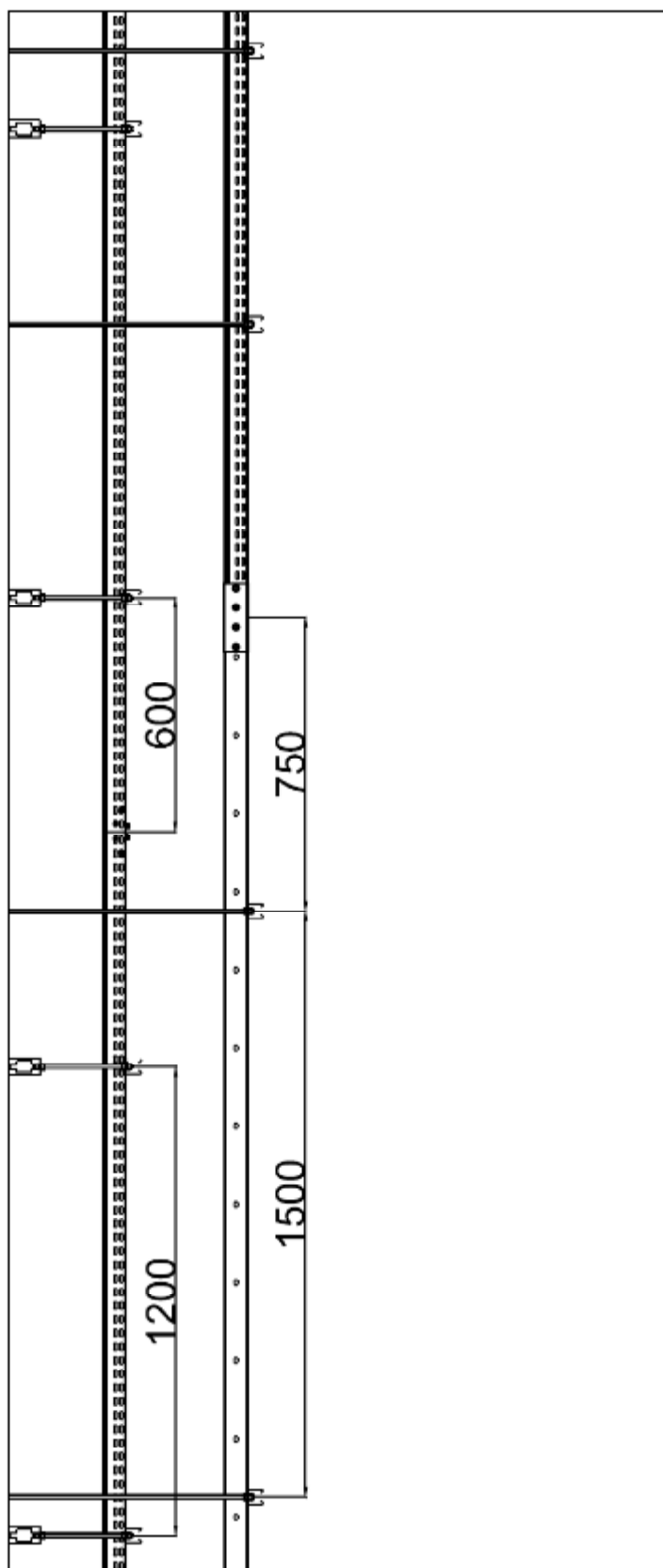
TELEFONIKA - BAKS 15.10.2015



G-G

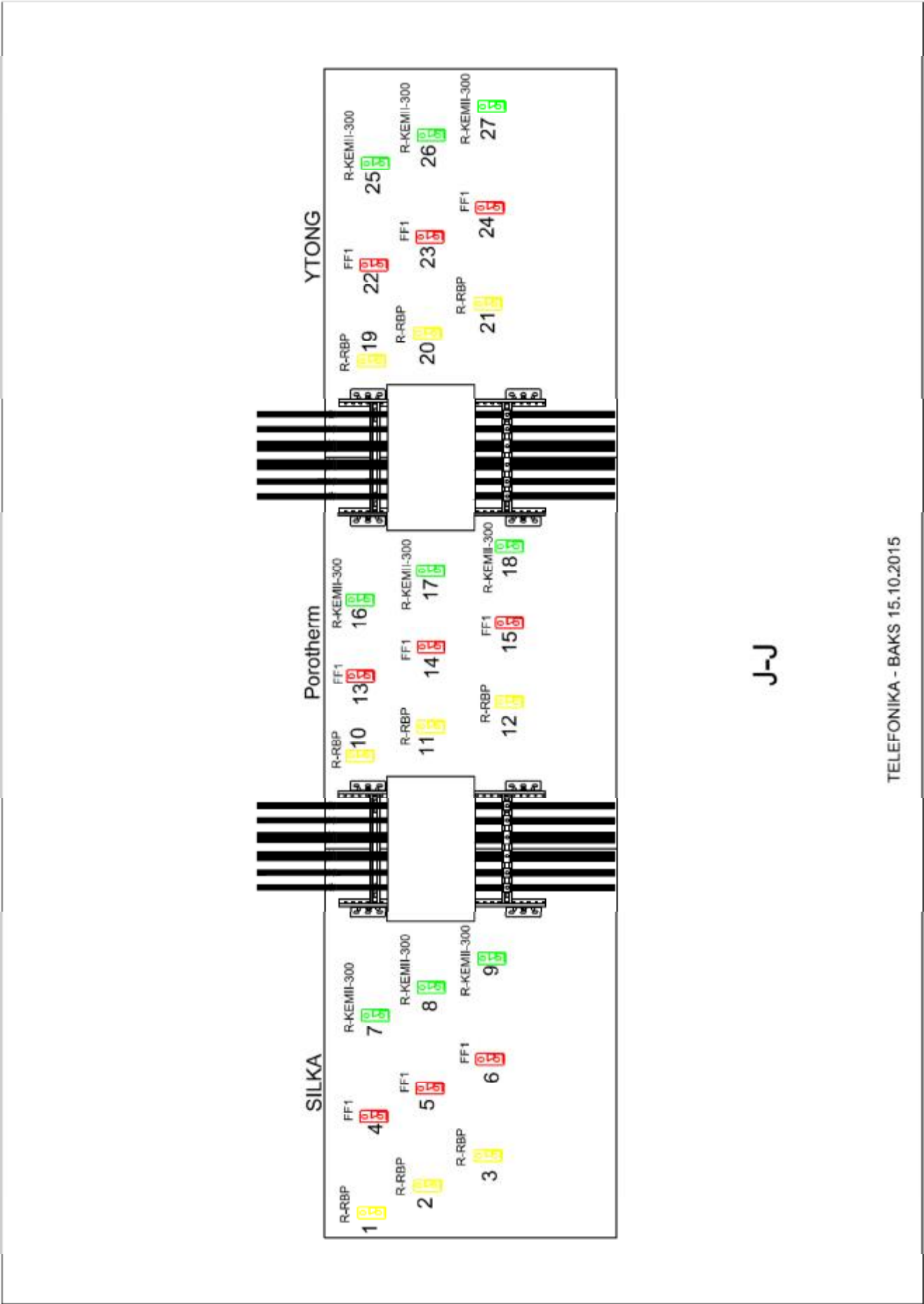
TELEFONIKA - BAKS 15.10.2015





I-I

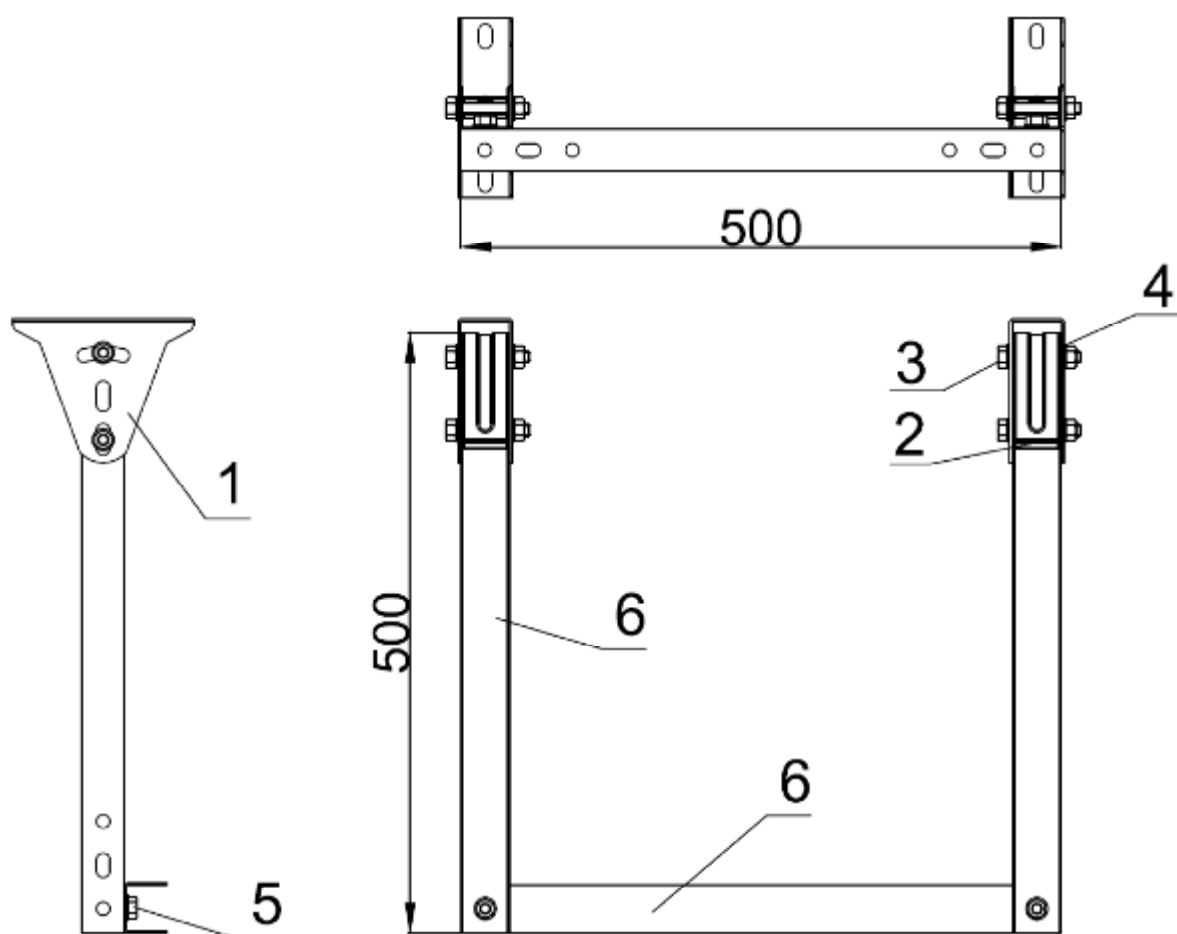
TELEFONIKA - BAKS 15.10.2015



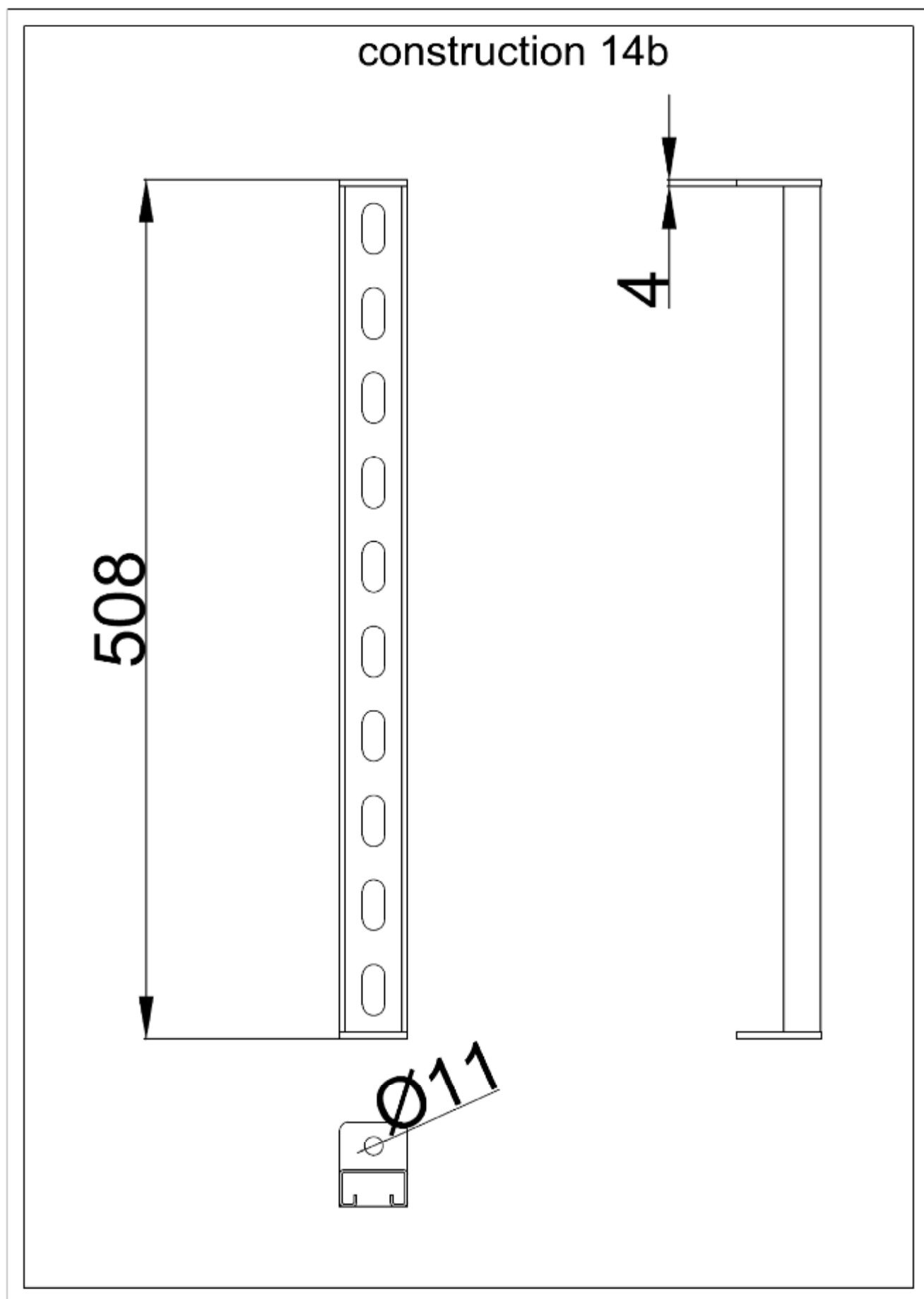


DRAWINGS

construction 14a

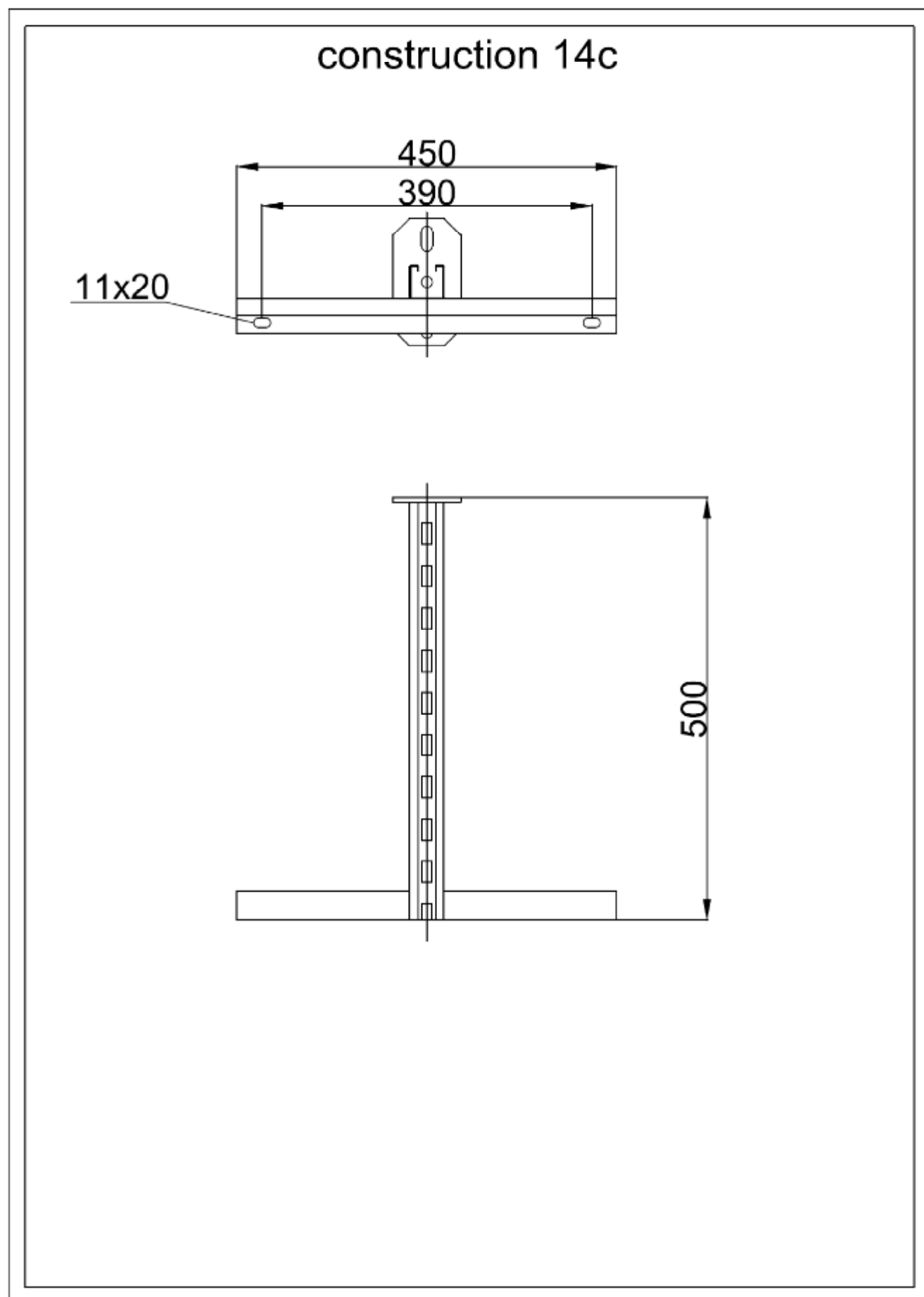


6	Ceownik		2
5	Śruba (kpl.) + podkładka	SMM10X20 + PP10	2
4	Podkładka	PP10	4
3	Śruba (kpl.)	SMM10X60	4
2	Blacha rozporowa	BR40	2
1	Podstawa sufitowa uchylna	PSU	2
L.p.	Nazwa	Symbol	Szt.



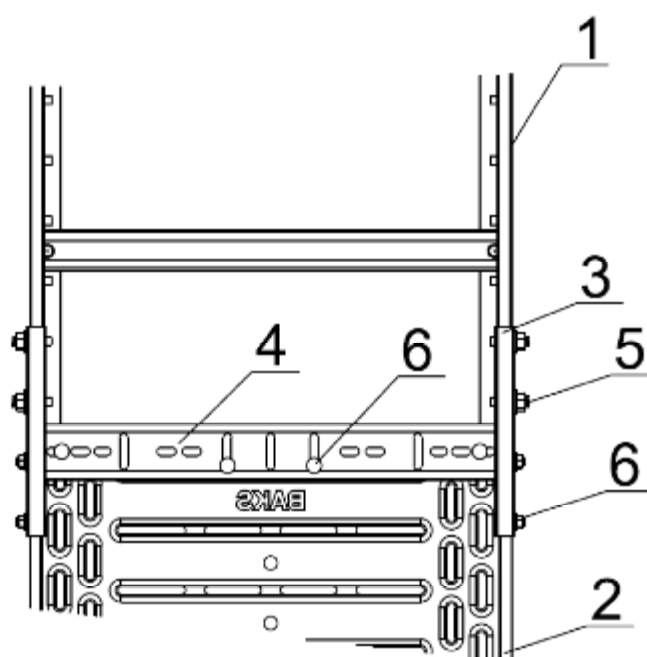
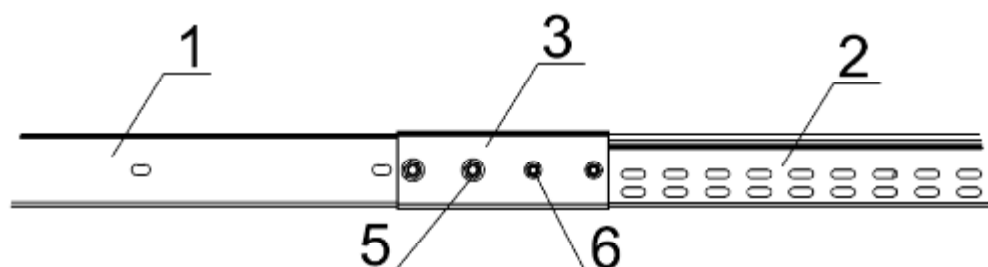


DRAWINGS





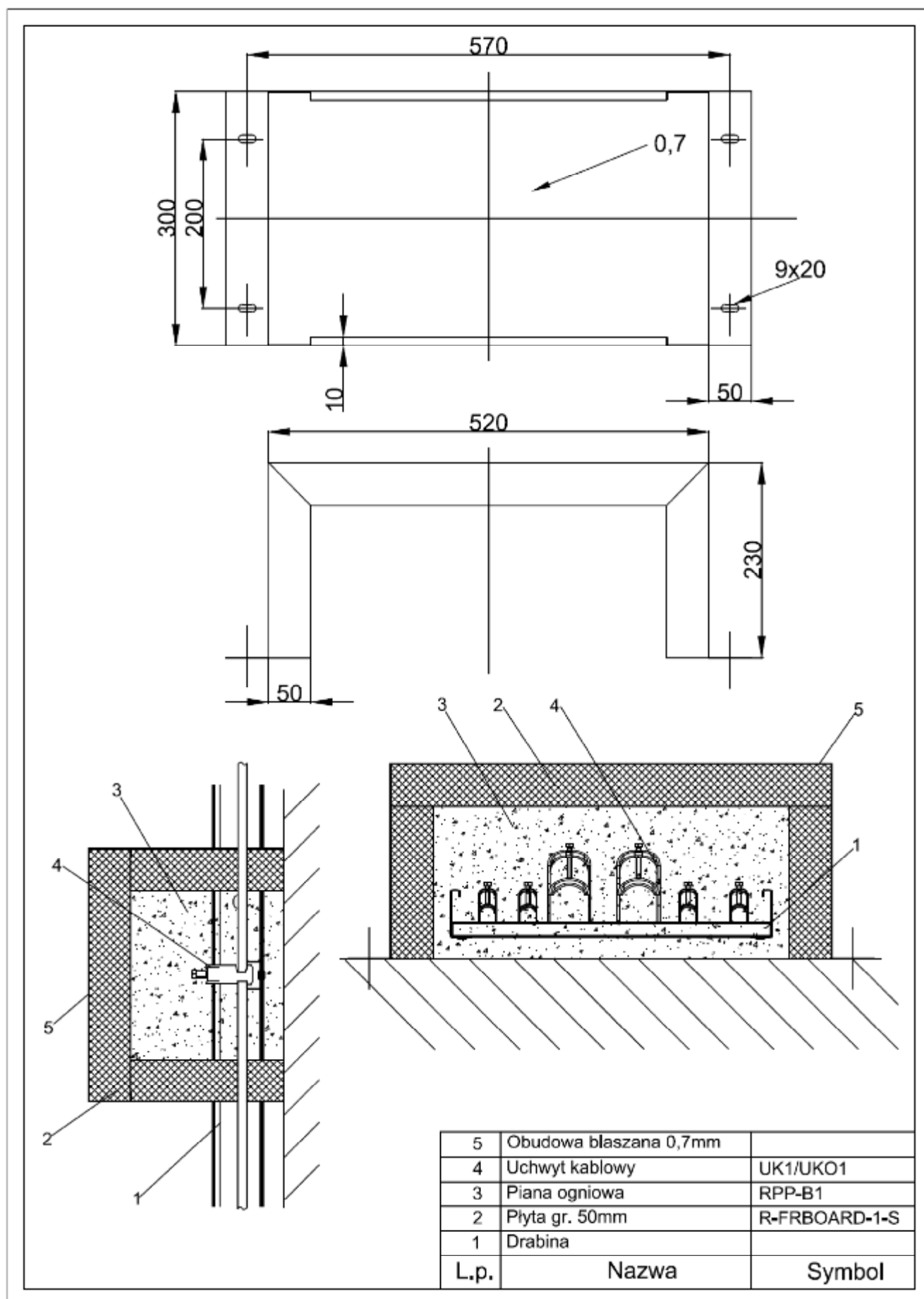
DRAWINGS



6	Śruba z łbem grzybkowym	SGKM6x12	8
5	Śruba z łbem grzybkowym	SGKM8x14	4
4	Blacha zakończeniowa	BZK/BZKO400	1
3	Łącznik drabiny	LDC/LDOCH60	2
2	Koryto	KGJ/KGOJ400H60/...	1
1	Drabina	DUP/DUOP400H60/...	1
L.p.	Nazwa	Symbol	Szt.



DRAWINGS





8. FINAL PROVISION

- § This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. 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

9. NORMATIVE REFERENCES

EN 1363-1: 2012	Fire resistance tests. Part 1: General requirements
STN 92 0205: 2014	Fire behaviour of construction products and building constructions. Circuit integrity maintenance of cable systems. Requirements, testing and classification.
DIN 4102 – 2: 1977-09	Fire behaviour of building materials and elements - requirements and testing
DIN 4102 – 12: 1998-11	Fire resistance of electric cable systems required to maintain circuit integrity
ZP-27/2008 PAVUS	Test method for determination of functionality class of cables and cable loadbearing constructions - cable circuits in case of fire

THE END OF THE TEST REPORT