TEST REPORT FIRES-FR-015-15-AUNE

Cable bearing system BAKS with cables business Dätwyler

Reg. No. 041/S-159

The Experts on Fire Safety

TEST REPORT

FIRES-FR-015-15-AUNE

Tested property:	Functional resistance in fire
Test method:	STN 92 0205: 2014 (ZP-27/2008, DIN 4102-12: 1998-11) acc. to cl. 1 of this test report
Type of test:	Accredited
Date of issue:	09. 03. 2015
Name of the product:	Cable bearing system BAKS with cables business Dätwyler
Manufacturer:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland (producer of cable bearing system) Dätwyler AG, Gotthardstrasse 31, CH-6460 Altdorf, Switzerland (producer of cables)
Sponsor:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland
Test carried out by:	FIRES, s.r.o., Testing laboratory
Task No.:	PR-15-0040
Specimens received:	02. 02. 2015
Date of the test:	05. 02. 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: 1999 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1:1999 are used. Measurement by plate thermometers acc. to EN 1363-1: 1999 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1: 1999. Therefore, it is possible to use results of test according to STN 92 025 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. Łukasz Winiarczyk	BAKS Kazimierz Sielski
Mr. Dariusz Gowronski	BAKS Kazimierz Sielski

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

2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 004	Horizontal test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 020	Driver Tecomat - Reliance (SW)	-
F 71 041, F 71 042	Transducer of differential pressure (–50 to + 150) Pa	measurement of pressure inside the test furnace
F 54 064	Digital calliper (0 to 160) mm	-
F 54 056	Racking meter	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	measurement of climatic conditions

Identification number	Measuring equipment	Note
F 10 521 - F 10 528	Plate thermometers	measurement of temperature inside the test furnace according to EN 1363-1
F 10 701	Sheathed thermocouple type K Ø 3 mm	measurement of ambient temperature
F 57 007	Digital stop-watch	-
F 96 015	Test signal panel	-

3. PREPARATION OF THE SPECIMENS

Testing laboratory didn't take off individual components of the specimens. Components take-off and its delivering to the testing laboratory were carried out by the test sponsor. Assembling of the supporting system into the test furnace and mounting of cables and weights into the supporting system was carried out by workers of BAKS Kazimierz Sielski under supervision of laboratory technician.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

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

Cables
Used cables by test:

Power cables:

(N)HXH 4x1,5RE FE180 E90	(18x)
(N)HXH 5x16RM FE180 E90	(4x)
(N)HXH 4x50RM FE180 E90	(14x)
(N)HXCH 4x1,5RE/1,5 FE180 E90	(18x)
(N)HXCH 4x16RM/16 FE180 E90	(4x)
(N)HXCH 4x50RM/25 FE180 E90	(14x)

Communication cables:

JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	(18x)

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

Cable bearing systems were made of following constructions:

Suspension tracks No. 1 and 2
Tracks are made of four consoles (WPCB800) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable trays (KGL/KGOL300H60, height 60 mm, width 300 mm, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m^{-1}. Cables are fixed to trays by cable clips (UDF).

Suspension track No. 3
Track is made of four consoles (WPCB500) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

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

Suspension track No. 4
Track is made of four consoles (WPCB800) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable ladders (DUD400H60, height 60 mm, width 400 mm, 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 10kg.m^{-1}. Cables are fixed to ladders by cable clamps (UK1/UKO1).

Suspension tracks No. 5 and 6
Tracks are made of four consoles (WPCB800) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable mesh trays (KDS/KDSO300H60, height 60 mm, width 300 mm, steel wire ∅ 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).

Suspension tracks No. 7 and 8
Tracks are made of four consoles (WPCB800) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO300) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable trays (KFL300H60, height 60 mm, width 300 mm, steel sheet thickness 0,7 mm) fixed together by integrated junctions and one screw (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m^{-1}. Cables are fixed to trays by cable clips (UDF).

Suspension track No. 9
Track is made of four consoles (WPCB500) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

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

Suspension track No. 10
Track is made of four consoles (WPCB800) fixed to ceiling by threaded rods (PG M10) in spacing of 1500 mm. Brackets (WWS/WWSO400) are fixed to consoles by screws (SM M10x80). Consoles are reinforced in place of fixing brackets by spacer (BR55).

Cable ladders (DUD/DUOD400H60, height 60 mm, width 400 mm, 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 10kg.m^{-1}. Cables are fixed to ladders by cable clamps (UK1/UKO1).

Ceiling tracks No. 11 – 13

Track No. 11:
Track is made of cable hangers (OZ/OZO) fixed to ceiling by expansion screws (MKR ∅6 x 30) in spacing of 600 mm and loaded with 6kg.m^{-1}.

Track No. 12:
Track is made of cable hangers (OZS/OZSO) fixed to ceiling by expansion screws (MKR ∅6 x 30) in spacing of 600 mm and loaded with 2kg.m^{-1}.

Track No. 13:
Track is made of cable hangers (OZM/OZMO) fixed to ceiling by expansion screws (MKR ∅6 x 30) in spacing of 600 mm and loaded with 1kg.m^{-1}.

Ceiling track No. 14
Track is made of steel pipes (Ø 16 mm, Ø 63 mm) fixed to ceiling by hangers (OBS) in spacing of 1500 mm. Steel pipes are at mid-length separated and there is created the offset.

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 THE SPECIMENS FIXATION

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

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

4.3 INSPECTION OF THE SPECIMENS

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

4.4 CLIMATIC CONDITIONING OF THE SPECIMENS

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

Ambient air temperature [°C]

mean	18,8
standard deviation	1,4

Relative air humidity [%]

mean	45,3
standard deviation	2,6

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

5. CARRYING OUT OF THE TEST

5.1 TEST GENERALLY

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

5.2 CONDITIONS OF THE TEST

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

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

Relative air humidity [%]	Ambient air temperature [°C]
44,1	18,2

5.3 RESULTS OF THE TEST

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

6. CLOSING

Evaluation of the test:

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
1	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**10**	56 minutes
2	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption
3	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**9**	40 minutes
4	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption
5	2 cables (N)HXCH 4x50RM/25 FE180 E90	**14**	90 minutes no failure / interruption
6	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90		76 minutes
7	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
8	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**8**	45 minutes
9	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption
10	2 cables (N)HXH 4x1,5RE FE180 E90	**7**	49 minutes
11	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
12	2 cables (N)HXH 4x1,5RE FE180 E90	**14**	67 minutes
13	2 cables (N)HXH 4x1,5RE FE180 E90	**13**	90 minutes no failure / interruption
14	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90		52 minutes
15	2 cables (N)HXCH 4x16RM/16 FE180 E90		90 minutes no failure / interruption
16	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**6**	90 minutes no failure / interruption
17	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption
18	2 cables (N)HXH 4x1,5RE FE180 E90	**5**	90 minutes no failure / interruption
19	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
20	2 cables (N)HXH 5x16RM FE180 E90	**13**	90 minutes no failure / interruption
21	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**12**	90 minutes no failure / interruption
22	2 cables (N)HXH 4x1,5RE FE180 E90		58 minutes
23	2 cables (N)HXCH 4x16RM/16 FE180 E90		90 minutes no failure / interruption
24	2 cables (N)HXH 4x1,5RE FE180 E90	**4**	56 minutes
25	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
26	2 cables (N)HXH 4x1,5RE FE180 E90	**3**	45 minutes
27	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
28	2 cables (N)HXH 5x16RM FE180 E90	**12**	90 minutes no failure / interruption
29	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**11**	90 minutes no failure / interruption
30	2 cables (N)HXH 4x1,5RE FE180 E90		90 minutes no failure / interruption
31	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90	**2**	56 minutes
32	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
33	2 cables (N)HXH 4x1,5RE FE180 E90	1	37 minutes
34	2 cables (N)HXH 4x50RM FE180 E90		90 minutes no failure / interruption
35	2 cables (N)HXH 4x50RM FE180 E90	11	84 minutes
36	2 cables (N)HXCH 4x50RM/25 FE180 E90		90 minutes no failure / interruption
52	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	7	51 minutes
53	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		35 minutes
54	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	14	27 minutes
55	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		24 minutes
56	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	13	24 minutes
57	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		25 minutes
58	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	5	37 minutes
59	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		35 minutes
60	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	12	26 minutes
61	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		28 minutes
62	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	4	77 minutes
63	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		35 minutes
64	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	3	39 minutes
65	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		37 minutes
66	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	11	37 minutes
67	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		23 minutes
68	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	1	32 minutes
69	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		29 minutes

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

Specimens S1 – S36 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S69 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

Circuit breakers with rating 3 A were used.

7. DIRECT APPLICATION OF TEST RESULTS

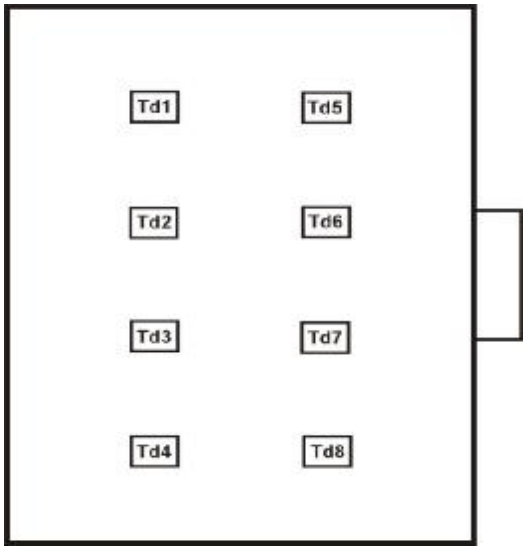
Direct field of application is valid in accordance with STN 92 0205: 2014 (cl. 7), ZP-27/2008 (cl. 11) and DIN 4102-12: 1998-11 (clause 8). Validity of individual items of field of direct application shall be determined in classification process.

Measured values inside the test furnace

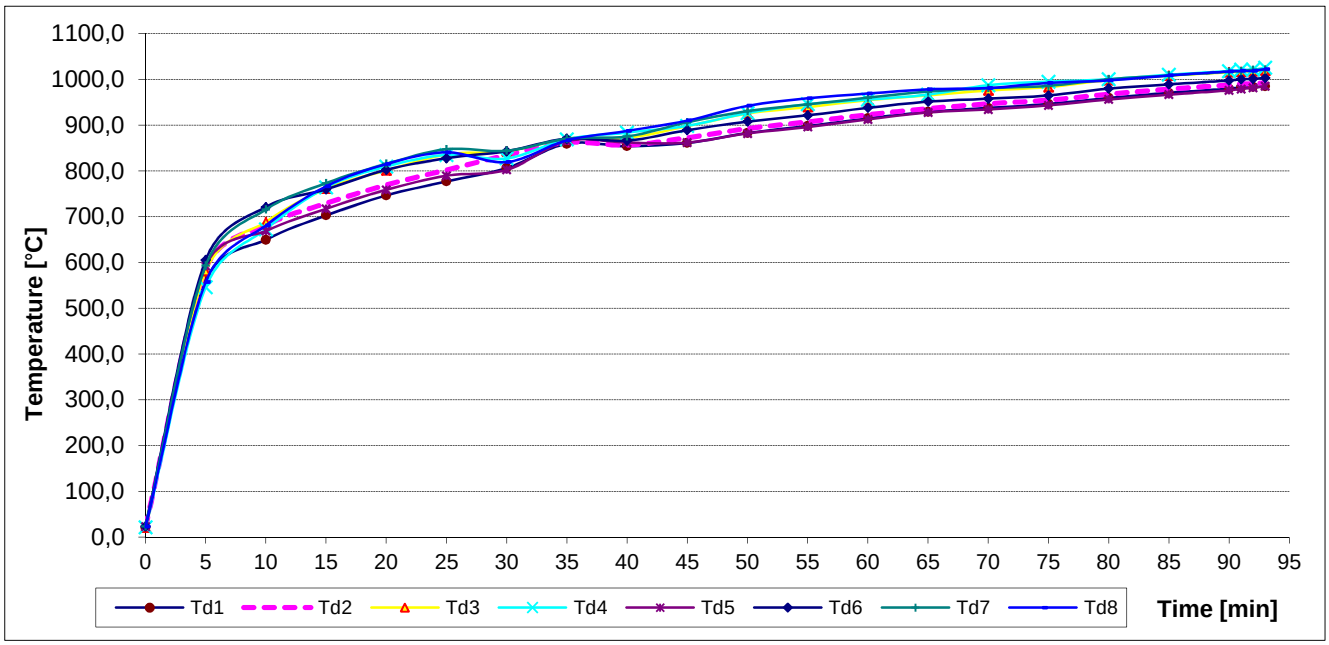
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	20,7	21,5	20,8	21,2	22,9	23,8	23,2	23,1	22,2	20,0	19,2	0,0	18,7
5	560,7	585,8	580,7	545,8	592,1	605,5	593,5	556,9	577,6	576,0	19,3	-1,2	17,8
10	649,6	680,9	688,6	672,5	668,7	720,9	715,6	680,6	684,7	678,0	19,3	-0,1	17,6
15	702,9	729,3	761,2	764,2	717,3	760,0	773,4	766,4	746,8	739,0	19,4	0,5	17,8
20	746,5	769,4	801,2	809,7	758,8	802,5	815,5	815,0	789,8	781,0	19,4	0,7	19,7
25	777,2	802,1	835,8	834,8	789,5	827,9	847,5	840,6	819,4	815,0	19,5	0,8	18,3
30	806,4	834,6	843,2	827,4	802,4	843,3	844,2	819,3	827,6	842,0	19,5	0,5	17,1
35	859,5	862,3	869,8	869,0	865,5	870,4	870,3	866,9	866,7	865,0	19,6	0,2	18,2
40	854,1	856,3	872,1	883,9	862,0	866,4	875,4	887,5	869,7	885,0	19,6	0,0	19,4
45	861,2	872,5	897,7	898,6	861,9	889,1	906,3	910,0	887,2	902,0	19,7	-0,3	19,0
50	883,0	892,6	925,3	926,6	881,9	907,9	930,8	942,2	911,3	918,0	19,7	-0,3	19,5
55	898,0	907,0	939,5	945,7	895,9	921,6	945,2	958,8	926,5	932,0	19,8	-0,4	18,5
60	914,9	922,9	954,7	955,8	912,4	937,9	960,0	969,0	941,0	945,0	19,9	-0,4	19,4
65	929,4	936,1	965,3	966,8	927,8	951,5	973,5	978,2	953,6	957,0	19,9	-0,4	19,9
70	937,6	946,6	975,7	987,4	934,2	957,8	980,9	981,0	962,7	968,0	20,0	-0,4	18,0
75	946,4	954,8	983,3	994,9	943,1	965,0	986,0	992,4	970,7	979,0	20,0	-0,4	17,8
80	959,6	967,7	998,5	1000,4	956,3	980,0	1000,1	997,7	982,5	988,0	20,0	-0,4	17,3
85	970,6	978,8	1008,3	1010,4	966,6	989,2	1008,5	1008,7	992,6	997,0	20,1	-0,5	19,2
90	979,8	987,7	1015,6	1018,2	976,1	997,7	1016,7	1017,4	1001,2	1006,0	20,2	-0,5	18,7
91	982,1	990,1	1016,4	1021,2	979,1	1000,2	1018,1	1018,7	1003,2	1008,0	20,1	-0,5	19,6
92	983,6	990,8	1018,2	1021,3	981,4	1001,0	1020,7	1018,4	1004,4	1009,0	20,2	-0,5	18,0
93	984,9	992,5	1019,1	1025,4	985,1	1003,0	1021,0	1022,4	1006,7	1011,0	20,2	-0,5	18,4

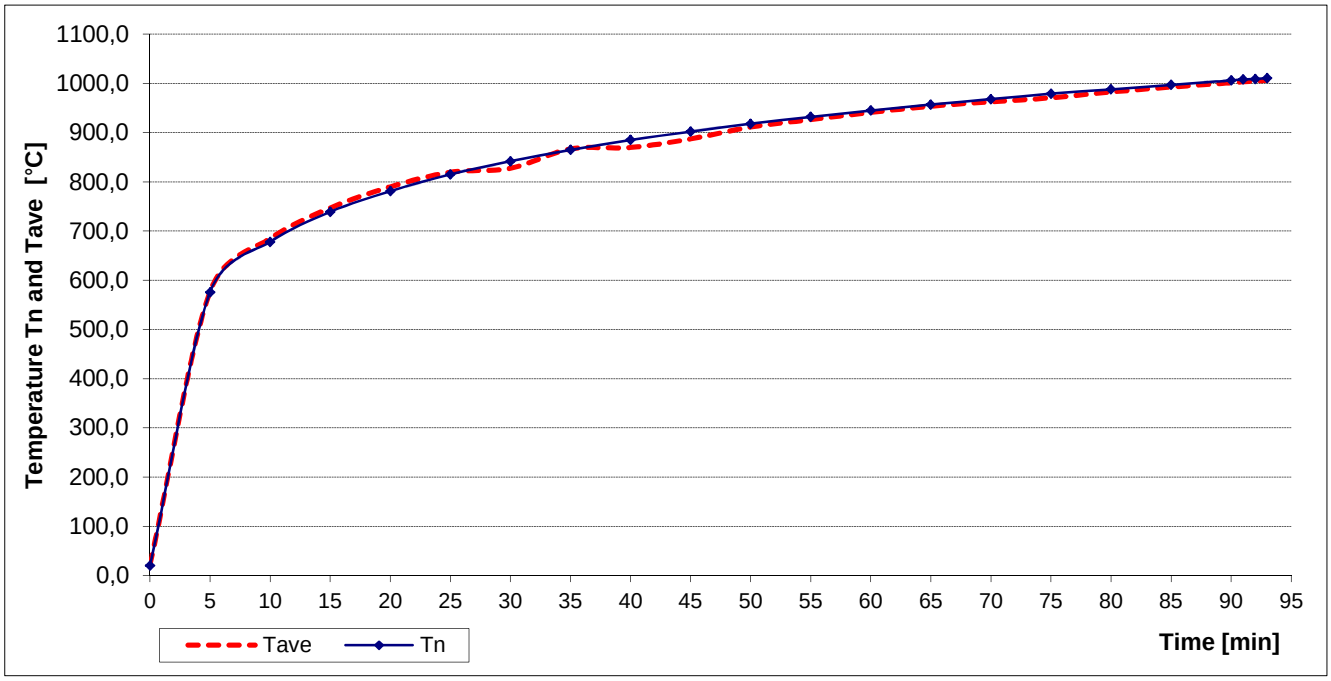
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

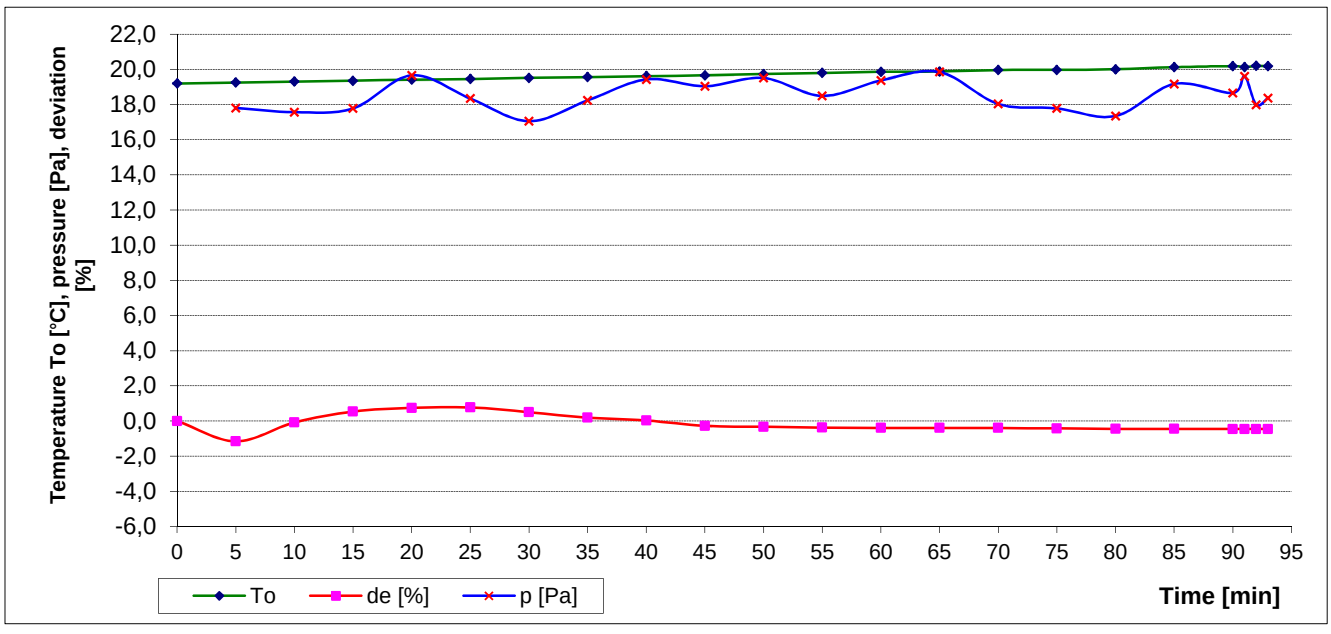
Layout of measuring points inside the test furnace:



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	56:18
	3-L3	x
	4-PEN	x
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	40:28
	10-L2	x
	11-L3	x
	12-PEN	x
S4	13-L1	no failure / interruption
	14-L2	no failure / interruption
	15-L3	no failure / interruption
	16-PEN	no failure / interruption
S5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S6	21-L1	x
	22-L2	76:05
	23-L3	x
	24-PEN	x
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	45:40
	31-L3	x
	32-PEN	x
S9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption
S10	37-L1	x
	38-L2	49:54
	39-L3	x
	40-PEN	x

Specimen No.	Cables
1	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
2	2 cables (N)HXCH 4x50RM/25 FE180 E90
3	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
4	2 cables (N)HXCH 4x50RM/25 FE180 E90
5	2 cables (N)HXCH 4x50RM/25 FE180 E90
6	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
7	2 cables (N)HXH 4x50RM FE180 E90
8	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
9	2 cables (N)HXCH 4x50RM/25 FE180 E90
10	2 cables (N)HXH 4x1,5RE FE180 E90

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

Measured time of tested specimens from 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	x
	46-L2	67:18
	47-L3	67:18
	48-PEN	x
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	52:43
	55-L3	x
	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	no failure / interruption
	62-L2	no failure / interruption
	63-L3	no failure / interruption
	64-PEN	no failure / interruption
S17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
S18	69-L1	no failure / interruption
	70-L2	no failure / interruption
	71-L3	no failure / interruption
	72-PEN	no failure / interruption
S19	73-L1	no failure / interruption
	74-L2	no failure / interruption
	75-L3	no failure / interruption
	76-PEN	no failure / interruption
S20	77-L1	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption

Specimen No.	Cables
11	2 cables (N)HXH 4x50RM FE180 E90
12	2 cables (N)HXH 4x1,5RE FE180 E90
13	2 cables (N)HXH 4x1,5RE FE180 E90
14	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
15	2 cables (N)HXCH 4x16RM/16 FE180 E90
16	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
17	2 cables (N)HXCH 4x50RM/25 FE180 E90
18	2 cables (N)HXH 4x1,5RE FE180 E90
19	2 cables (N)HXH 4x50RM FE180 E90
20	2 cables (N)HXH 5x16RM FE180 E90

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Circuit breakers with rating 3 A were used.

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

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	x
	86-L2	58:34
	87-L3	x
	88-PEN	x
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	56:31
	94-L2	x
	95-L3	56:31
	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	x
	102-L2	45:54
	103-L3	x
	104-PEN	x
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 (N)HXCH 4x1,5RE/1,5 FE180 E90
22	2 cables (N)HXH 4x1,5RE FE180 E90
23	2 cables (N)HXCH 4x16RM/16 FE180 E90
24	2 cables (N)HXH 4x1,5RE FE180 E90
25	2 cables (N)HXH 4x50RM FE180 E90
26	2 cables (N)HXH 4x1,5RE FE180 E90
27	2 cables (N)HXH 4x50RM FE180 E90
28	2 cables (N)HXH 5x16RM FE180 E90
29	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
30	2 cables (N)HXH 4x1,5RE FE180 E90

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Circuit breakers with rating 3 A were used.

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

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	x
	122-L2	56:03
	123-L3	x
	124-PEN	x
S32	125-L1	no failure / interruption
	126-L2	no failure / interruption
	127-L3	no failure / interruption
	128-PEN	no failure / interruption
S33	129-L1	x
	130-L2	x
	131-L3	37:46
	132-PEN	x
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	84:06
	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

Specimen No.	Cables
31	2 cables (N)HXCH 4x1,5RE/1,5 FE180 E90
32	2 cables (N)HXCH 4x50RM/25 FE180 E90
33	2 cables (N)HXH 4x1,5RE FE180 E90
34	2 cables (N)HXH 4x50RM FE180 E90
35	2 cables (N)HXH 4x50RM FE180 E90
36	2 cables (N)HXCH 4x50RM/25 FE180 E90

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

Measured time of tested specimen S52 to S61 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52	209-L	51:57
	210-PEN	-
	211-L	62:50
	212-PEN	-
S53	213-L	35:58
	214-PEN	-
	215-L	35:58
	216-PEN	-
S54	217-L	27:51
	218-PEN	-
	219-L	31:19
	220-PEN	-
S55	221-L	24:33
	222-PEN	-
	223-L	61:58
	224-PEN	-
S56	225-L	24:50
	226-PEN	-
	227-L	38:06
	228-PEN	-
S57	229-L	37:01
	230-PEN	-
	231-L	25:13
	232-PEN	-
S58	233-L	38:09
	234-PEN	-
	235-L	37:51
	236-PEN	-
S59	237-L	35:58
	238-PEN	-
	239-L	36:37
	240-PEN	-
S60	241-L	30:19
	242-PEN	-
	243-L	26:37
	244-PEN	-
S61	245-L	37:32
	246-PEN	-
	247-L	28:03
	248-PEN	-

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

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

Measured time of tested specimens from S62 to S69 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S62	249-L	77:48
	250-PEN	-
	251-L	77:48
	252-PEN	-
S63	253-L	35:42
	254-PEN	-
	255-L	56:27
	256-PEN	-
S64	257-L	39:03
	258-PEN	-
	259-L	41:29
	260-PEN	-
S65	261-L	49:57
	262-PEN	-
	263-L	37:43
	264-PEN	-
S66	265-L	37:36
	266-PEN	-
	267-L	39:17
	268-PEN	-
S67	269-L	23:29
	270-PEN	-
	271-L	48:49
	272-PEN	-
S68	273-L	32:39
	274-PEN	-
	275-L	37:12
	276-PEN	-
S69	277-L	29:13
	278-PEN	-
	279-L	51:34
	280-PEN	-

Specimen No.	Cables
62	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
63	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
64	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
65	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
66	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
67	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
68	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
69	cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90

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

PHOTOS

Photo taken before the test.

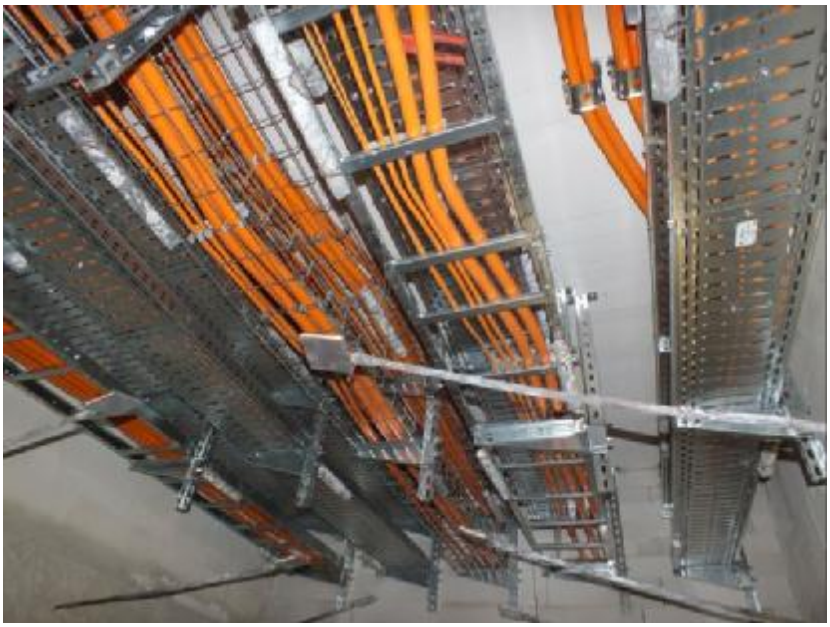


Photo taken before the test.

Photo taken before the test.

PHOTOS

Photo taken before the test.

Photo taken before the test.

Photo taken before the test.

PHOTOS

Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

PHOTOS

Photo taken after the test.

Photo taken after the test.

Photo taken after the test.

PREVENTIVE FIRE PROTECTION

(N)HXH FE180 E90

Safety cable 0.6/1 kV, Keram

halogen-free, with improved fire characteristics,
with reference to VDE 0266 and CENELEC HD 604 S1,
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331,
System Circuit Integrity E90* in accordance with DIN 4102-12

PRODUCT INFORMATION

APPLICATION

Cables with intrinsic fire resistance are installed in all areas that require special protection of people and equipment against fire and fire damages and where strict security requirements must be fulfilled.
Suitable for indoor applications.
For outdoor applications, protection must be provided against exposure to direct sunlight.
The cable should only be laid directly in earth or water if a protective conduit is used.
These cables correspond to the demands of System Circuit Integrity E90* in accordance with DIN 4102-12. System Circuit Integrity is guaranteed at an operating voltage up to 400V.
Permitted operating temperature at conductor of +90°C.

CONSTRUCTION

Conductor	Bare copper, solid or stranded, IEC 60228, EN 60228 (VDE 0295)
Insulation	Double insulation, cross-linked, high-performance Keram special compound, VDE 0266 "HXI1"
Filler	Flame retardant, halogen-free, thermoplastic compound
Outer sheath	Flame retardant Polyolefin compound, CENELEC HD 604 S1 and VDE 0276-604 "HM4"
Core colours	CENELEC HD 308 S2 and VDE 0293
Sheath colour	Orange

ELECTRICAL PROPERTIES

Nominal voltage	0.6/1kV
Test voltage	4000V, 50Hz

GENERAL PROPERTIES

Minimum bending radius	during and permanent installation	15* x D (single-core cable) 12* x D (multicore cable) (D = outer diameter)
	permanent installation	*50% reduction if installation at 30°C and with a template
Operating temperature	permanent installation	-45°C to +90°C
	during installation	-5°C to +50°C

Zero halogen, non corrosive gases	IEC 60754-2, EN 50267-2-2, VDE 0482-267-2-2
Flame propagation	IEC 60332-1-2, EN 60332-1-2, VDE 0482-332-1-2
Flame spread	IEC 60332-3-22/-24 Cat. A/C, EN 60332-3-22/-24 Cat. A/C, VDE 0482-332-3-22/24 Cat. A/C
Smoke density	IEC 61034-1/-2, EN 61034-1/-2, VDE 0482-1034-1/-2
Circuit integrity (FE/PH)	IEC 60331-11/-21 (180minutes), VDE 0472 part 814 (FE180) IEC 60331-1, IEC 60331-2 (120 minutes), EN 50200, VDE 0482-200 (PH120) and EN 50362, VDE 0482-362 (120 minutes), BS 6387 C/W/Z
System Circuit Integrity (E90)*	DIN 4102 part 12
System Circuit Integrity under effect of water	VdS 3423 (single core cable ≥16mm²)

* System Circuit Integrity is dependent on installation method.

PREVENTIVE FIRE PROTECTION

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System Circuit Integrity E90* in accordance with DIN 4102-12

PRODUCT INFORMATION

Article No.	No. of cores x cross section n x mm²				Cu content kg/km	Total weight approx. kg/km	Outer diameter approx. mm	Fire load kWh/m
186141	1	x	16	RM	154	243	10.2	0.35
186142	1	x	25	RM	240	347	11.7	0.43
186143	1	x	35	RM	336	449	12.8	0.49
186144	1	x	50	RM	480	589	14.3	0.58
186145	1	x	70	RM	672	810	16.1	0.67
186146	1	x	95	RM	912	1090	18.5	0.85
186147	1	x	120	RM	1152	1318	19.6	0.91
186148	1	x	150	RM	1440	1648	21.8	1.11
186149	1	x	185	RM	1776	2029	24.0	1.32
186150	1	x	240	RM	2304	2658	27.2	1.63
186151	1	x	300	RM	2880	3166	29.6	1.91
188359	2	x	1.5	RE	29	178	11.0	0.48
187247	2	x	2.5	RE	48	217	11.8	0.54
187248	2	x	4	RE	77	272	12.8	0.62
187249	2	x	6	RE	115	337	13.8	0.70
187250	2	x	10	RE	192	459	15.4	0.83
187254	2	x	16	RM	307	714	19.0	1.19
187255	2	x	25	RM	480	1011	22.0	1.54
187256	2	x	35	RM	672	1287	24.2	1.79
187257	2	x	50	RM	960	1742	28.0	2.35
187258	2	x	70	RM	1344	2346	31.6	2.86
187259	2	x	95	RM	1824	3130	36.2	3.67
187260	2	x	120	RM	2304	3729	38.6	4.11
186174	3	x	1.5	RE	43	200	11.5	0.53
186177	3	x	2.5	RE	72	250	12.4	0.60
186182	3	x	4	RE	115	319	13.5	0.68
186186	3	x	6	RE	173	403	14.6	0.77
186189	3	x	10	RE	288	560	16.3	0.91
186152	3	x	16	RM	461	878	20.2	1.29
186153	3	x	25	RM	720	1299	24.0	1.75
186154	3	x	35	RM	1008	1664	26.4	2.02
186207	3	x	50	RM	1440	2189	29.8	2.51
187261	3	x	70	RM	2016	2997	33.9	3.09
187262	3	x	95	RM	2736	4007	38.9	3.95
187263	3	x	120	RM	3456	4812	41.5	4.39
187264	3	x	150	RM	4320	5988	46.0	5.32
187265	3	x	185	RM	5328	7363	50.7	6.44
187266	3	x	240	RM	6912	9632	57.6	8.10

RE = circular, solid conductor, RM = circular, stranded conductor

Additional dimensions available on request.
* System Circuit Integrity is dependent on installation method.

Subject to technical modification.

DÄTWYLER

CABLES

PREVENTIVE FIRE PROTECTION

(N)HXH FE180 E90

Safety cable 0.6/1kV, Keram

halogen-free, with improved fire characteristics,
with reference to VDE 0266 and CENELEC HD 604 S1,
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331,
System Circuit Integrity E90* in accordance with DIN 4102-12

PRODUCT INFORMATION

Article No.	No. of cores x cross section n x mm²	Cu content kg/km	Total weight approx. kg/km	Outer diameter approx. mm	Fire load kWh/m
191069	3 x 35 + 1 x 16 RM	1162	1833	27.4	2.13
191002	3 x 50 + 1 x 25 RM	1680	2457	31.3	2.69
191003	3 x 70 + 1 x 35 RM	2352	3362	35.6	3.34
191004	3 x 95 + 1 x 50 RM	3216	4488	40.7	4.24
191005	3 x 120 + 1 x 70 RM	4128	5532	44.0	4.82
191006	3 x 150 + 1 x 70 RM	4992	6666	48.0	5.70
191068	3 x 185 + 1 x 95 RM	6240	8315	53.4	7.00
186175	4 x 1.5 RE	58	234	12.4	0.61
186178	4 x 2.5 RE	96	296	13.4	0.69
186183	4 x 4 RE	154	381	14.6	0.78
186187	4 x 6 RE	230	490	15.8	0.90
186190	4 x 10 RE	384	695	17.8	1.07
186155	4 x 16 RM	614	1089	22.1	1.54
186156	4 x 25 RM	960	1618	26.3	2.05
186157	4 x 35 RM	1344	2083	29.0	2.36
186158	4 x 50 RM	1920	2752	32.8	2.97
186159	4 x 70 RM	2688	3804	37.6	3.55
186160	4 x 95 RM	3648	5092	43.1	4.75
187274	4 x 120 RM	4608	6133	46.0	5.27
186161	4 x 150 RM	5760	7662	51.2	6.49
187275	4 x 185 RM	7104	9425	56.5	7.85
190493	4 x 240 RM	9216	12334	64.1	9.85

RE = circular, solid conductor
RM = circular, stranded conductor

Additional dimensions available on request.
* System Circuit Integrity is dependent on installation method.

Subject to technical modification.

DATWYLER

PREVENTIVE FIRE PROTECTION

(N)HXH FE180 E90

Safety cable 0.6/1kV, Keram

halogen-free, with improved fire characteristics,
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circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331,
System Circuit Integrity E90* in accordance with DIN 4102-12

PRODUCT INFORMATION

Article No.	No. of cores x cross section n x mm²				Cu content kg/km	Total weight approx. kg/km	Outer diameter approx. mm	Fire load kWh/m
186176	5	x	1.5	RE	72	276	13.4	0.71
186179	5	x	2.5	RE	120	353	14.5	0.81
186184	5	x	4	RE	192	456	15.8	0.93
186188	5	x	6	RE	288	589	17.2	1.05
186191	5	x	10	RE	480	832	19.3	1.25
186162	5	x	16	RM	768	1361	24.8	1.86
186163	5	x	25	RM	1200	1960	28.8	2.42
186164	5	x	35	RM	1680	2547	32.0	2.86
186165	5	x	50	RM	2400	3392	36.5	3.68
187277	5	x	70	RM	3360	4667	41.5	4.51
185271	7	x	1.5	RE	101	331	14.4	0.81
186180	7	x	2.5	RE	168	426	15.6	0.92
186185	7	x	4	RE	269	563	17.1	1.05
172260	10	x	1.5	RE	144	457	17.8	1.09
187253	10	x	2.5	RE	240	593	19.4	1.24
185272	12	x	1.5	RE	173	513	18.3	1.20
186181	12	x	2.5	RE	288	675	20.0	1.37
185273	24	x	1.5	RE	346	901	24.6	1.99

RE = circular, solid conductor
RM = circular, stranded conductor

Additional dimensions available on request.
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CABLES

PREVENTIVE FIRE PROTECTION

(N)HXCH FE180 E90

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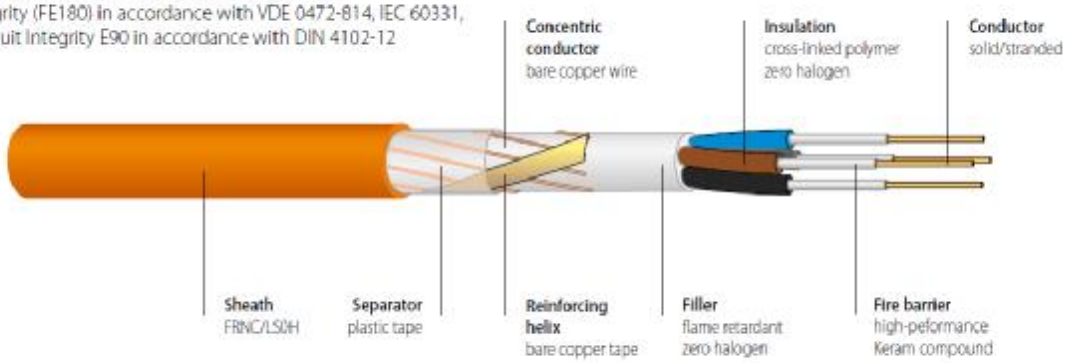
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331,
System Circuit Integrity E90 in accordance with DIN 4102-12



PRODUCT INFORMATION

APPLICATION

Cables with intrinsic fire resistance are installed in all areas that require special protection of people and equipment against fire and fire damages and where strict security requirements must be fulfilled.
Suitable for indoor applications.
For outdoor applications, protection must be provided against exposure to direct sunlight.
The cable should only be laid directly in earth or water if a protective conduit is used.
These cables correspond to the demands of System Circuit Integrity E90* in accordance with DIN 4102-12. System Circuit Integrity is guaranteed at an operating voltage up to 400V.
Permitted operating temperature at conductor of +90°C.

CONSTRUCTION

Conductor	Bare copper, solid or stranded, IEC 60228, EN 60228 (VDE 0295)
Insulation	Double insulation, cross-linked, high-performance Keram special compound, VDE 0266 "HXI1"
Filler	Halogen-free compound or plastic tape
Concentric conductor	Bare copper wires with reinforced helix
Separator	Plastic tape
Outer sheath	Polyolefin compound, CENELEC HD 604 S1, VDE 0276-604 "HM4"
Core colours	CENELEC HD 308 S2 and VDE 0293
Sheath colour	Orange

ELECTRICAL PROPERTIES

Nominal voltage	0.6/1kV
Test voltage	4000V, 50Hz

GENERAL PROPERTIES

Minimum bending radius	during and permanent installation	12 x D (multicore cable) (D = outer diameter)
Operating temperature	permanent installation	-45°C to +90°C
	during installation	-5°C to +50°C
Zero halogen, non corrosive gases		IEC 60754-2, EN 50267-2-2, VDE 0482-267-2-2
Flame propagation		IEC 60332-1-2, EN 60332-1-2, VDE 0482-332-1-2
Flame spread		IEC 60332-3-22/-24 Cat. A/C, EN 60332-3-22/-24 Cat. A/C, VDE 0482-332-3-22/24 Cat. A/C
Smoke density		IEC 61034-1/-2, EN 61034-1/-2, VDE 0482-1034-1/-2
Circuit integrity (FE/PH)		IEC 60331-11/-21 (180minutes) , VDE 0472 part 814 (FE180) IEC 60331-1, IEC 60331-2 (120 minutes), EN 50200, VDE 0482-200 (PH120) and EN 50362, VDE 0482-362 (120 minutes), BS 6387 C/W/Z
System Circuit Integrity (E90)*		DIN 4102 part 12
System Circuit Integrity under effect of water		VdS 3423 (n x ≥16mm²)

* System Circuit Integrity is dependent on installation method.

Subject to technical modification.

DATWYLER

PREVENTIVE FIRE PROTECTION

(N)HXCH FE180 E90

Safety cable 0.6/1kV, Keram

halogen-free, with improved fire characteristics,
with reference to VDE 0266 and CENELEC HD 604 S1,
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331,
System Circuit Integrity E90* in accordance with DIN 4102-12

PRODUCT INFORMATION

Article No.	No. of cores x cross section n x mm²	Cu content kg/km	Total weight approx. kg/km	Outer diameter approx. mm	Fire load kWh/m
186071	3 x 1.5 RE/1.5	66	248	13.2	0.65
186195	3 x 2.5 RE/2.5	104	308	14.1	0.72
186197	3 x 4 RE/4	161	404	15.7	0.84
187278	3 x 6 RE/6	240	504	16.8	0.94
187279	3 x 10 RE/10	408	727	18.6	1.15
187251	3 x 16 RM/16	643	1166	24.4	1.64
187406	3 x 25 RM/16	902	1496	25.8	1.95
172417	3 x 35 RM/16	1190	1820	28.2	2.25
187408	3 x 50 RM/25	1723	2493	32.5	2.90
187409	3 x 70 RM/35	2410	3350	36.1	3.42
187410	3 x 95 RM/50	3296	4570	42.0	4.50
187411	3 x 120 RM/70	4236	5620	45.4	5.02
187412	3 x 150 RM/70	5100	6850	50.7	6.00
187413	3 x 185 RM/95	6383	8350	55.0	7.10
187414	3 x 240 RM/120	8242	11100	62.1	9.08
186072	4 x 1.5 RE/1.5	81	286	14.1	0.73
186196	4 x 2.5 RE/2.5	128	358	15.1	0.82
186198	4 x 4 RE/4	200	473	16.8	0.96
186199	4 x 6 RE/6	297	621	18.1	1.13
186200	4 x 10 RE/10	504	868	20.1	1.33
186131	4 x 16 RM/16	796	1400	25.3	1.81
186132	4 x 25 RM/16	1142	1895	28.9	2.28
186133	4 x 35 RM/16	1526	2376	31.6	2.60
186134	4 x 50 RM/25	2203	3249	36.7	3.49
186135	4 x 70 RM/35	3082	4426	41.3	4.25
186136	4 x 95 RM/50	4208	5809	46.4	5.53
186137	4 x 120 RM/70	5388	7134	50.1	6.25
186138	4 x 150 RM/70	6540	8703	55.3	7.58
186139	4 x 185 RM/95	8159	10827	60.8	9.18
186140	4 x 240 RM/120	10546	14139	69.2	11.60
186073	7 x 1.5 RE/2.5	133	393	16.1	0.94
191096	7 x 2.5 RE/2.5	200	491	17.3	1.05
187415	12 x 1.5 RE/2.5	205	595	20.2	1.38
172461	12 x 2.5 RE/4	334	798	22.6	1.63
187402	24 x 1.5 RE/6	413	901	27.4	2.32
187403	24 x 2.5 RE/10	696	1205	30.6	2.69
187404	30 x 1.5 RE/6	499	1252	29.1	2.67
187405	30 x 2.5 RE/10	840	1692	32.2	3.11

RE = circular, solid conductor, RM = circular, stranded conductor

Additional dimensions available on request.
* System Circuit Integrity is dependent on installation method.

Subject to technical modification.

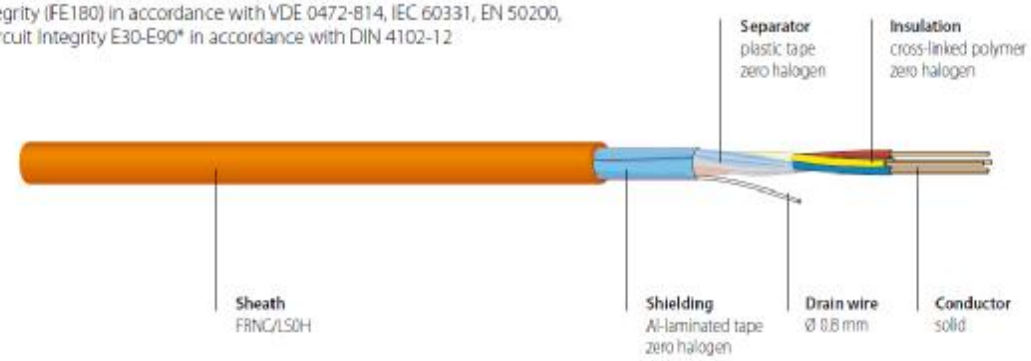
DÄTWYLER

PREVENTIVE FIRE PROTECTION

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

Wiring cable for industrial electronics max. 225V, Keram

halogen-free, with improved fire characteristics,
with reference to VDE 0815,
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331, EN 50200,
System Circuit Integrity E30-E90* in accordance with DIN 4102-12



PRODUCT INFORMATION

APPLICATION

Cables with intrinsic fire resistance are installed in all areas that require special protection of people and equipment against fire and fire damages and where strict security requirements must be fulfilled.
Suitable for indoor applications.
For outdoor applications, protection must be provided against exposure to direct sunlight.
The cable should only be laid directly in earth or water if a protective conduit is used.
These cables correspond to the demands of System Circuit Integrity E30-E90* in accordance with DIN 4102-12. System Circuit Integrity is guaranteed at an operating voltage up to 110V.
Permitted operating temperature at conductor of +70°C.

CONSTRUCTION

Conductor	Bare copper, solid, 0.8 mm diameter, VDE 0815
Insulation	Fire-resistant, cross-linked, high-performance Keram special compound, EN 50290-2-26
Core colours	VDE 0815, bundles identified by numbered tape
Separator	PEPT "Plastic Tape"
Shielding	Al-laminated tape with tinned copper drain wire Ø 0.8 mm
Outer sheath	Flame retardant polyolefin compound, VDE 0819 part 107, EN 50290-2-27 and VDE 0250-214 "HM 2"
Sheath colour	Orange

ELECTRICAL PROPERTIES

Insulation resistance	minimum 100 MΩ x km
Loop resistance	maximum 73.2 Ω/km at 0.80 mm
Capacitance unbalance	maximum 120 nF/km at 800 Hz
Capacitance coupling	K maximum 200 pF/100m at 800 Hz
Rated voltage	maximum 225 V
Test voltage	500 V, 50 Hz Core/Core 2000 V, 50Hz, Core/Screen

GENERAL PROPERTIES

Minimum bending radius	during installation	7.5 x D (D = outer diameter)
	permanent installation	2.5 x D
Crush resistance	≥ 1000 N/10 cm	
Impact	≥ 10 impacts	
Operating temperature	permanent installation	-30°C to +70°C
	during installation	-5°C to +50°C

Zero halogen, non corrosive gases	IEC 60754-2, EN 50267-2-2, VDE 0482-267-2-2
Flame propagation	IEC 60332-1-2, EN 60332-1-2, VDE 0482-332-1-2
Flame spread	IEC 60332-3-22/-24 Cat. A/C, EN 60332-3-22/-24 Cat. A/C, VDE 0482-332-3-22/24 Cat. A/C
Smoke density	IEC 61034-1/-2, EN 61034-1/-2, VDE 0482-1034-1/-2
Circuit integrity (FE/PH)	IEC 60331-11/-21 (180minutes), VDE 0472 part 814 (FE180), IEC 60331-2, EN 50200, VDE 0482-200
System Circuit Integrity (E30-E90)*	DIN 4102 part 12, NBN 713-020 (Rf 1½)

* System Circuit Integrity is dependent on installation method.

Subject to technical modification.

DÄTWYLER

PREVENTIVE FIRE PROTECTION

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

Wiring cable for industrial electronics max. 225V, Keram
halogen-free, with improved fire characteristics,
with reference to VDE 0815,
circuit integrity (FE180) in accordance with VDE 0472-814, IEC 60331, EN 50200,
System Circuit Integrity E30-E90* in accordance with DIN 4102-12

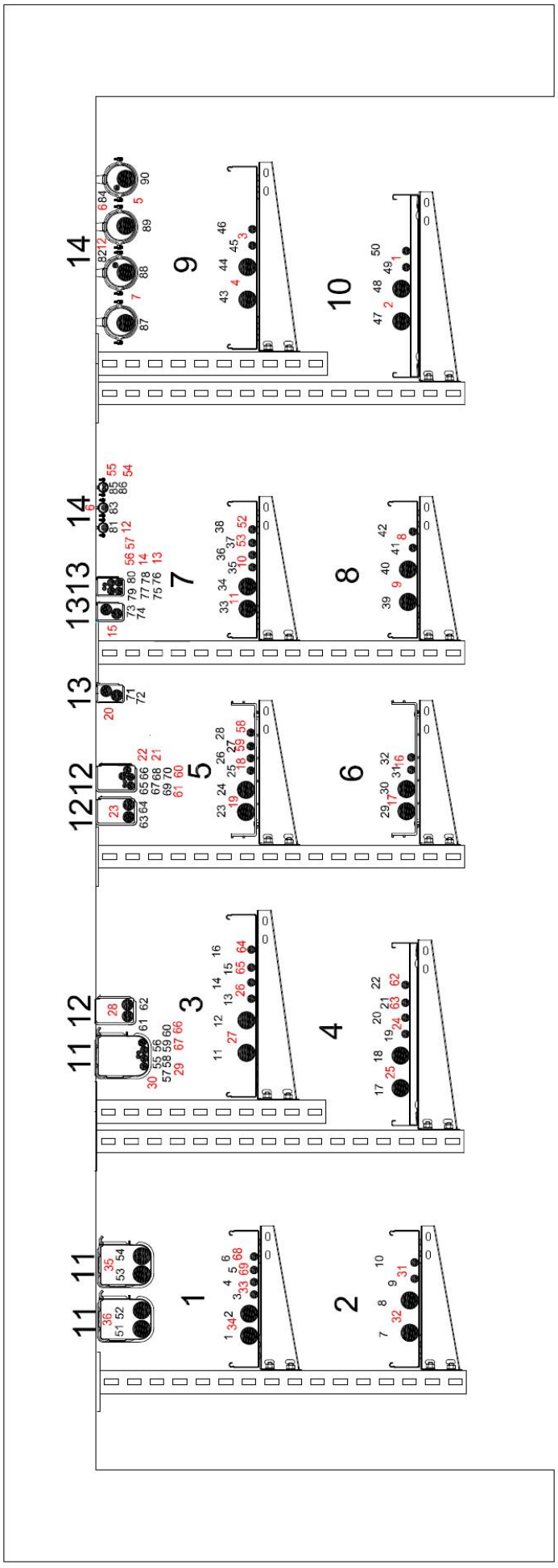
PRODUCT INFORMATION

Article No.	No. of cores x conductor diameter n x mm	Cu content kg/km	Total weight approx. kg/km	Outer diameter approx. mm	Fire load kWh/m
188092	1 x 2 x 0.80	15	40	5.5	0.095
188097	2 x 2 x 0.80	25	56	6.0	0.123
188099	4 x 2 x 0.80	45	96	8.7	0.21
188102	8 x 2 x 0.80	85	218	13.7	0.52
188104	12 x 2 x 0.80	126	270	14.6	0.58
188106	16 x 2 x 0.80	166	337	16.0	0.69
188108	20 x 2 x 0.80	206	403	18.0	0.80
188111	32 x 2 x 0.80	326	570	21.8	1.02
188113	40 x 2 x 0.80	407	739	25.3	1.38
188115	52 x 2 x 0.80	529	906	27.6	1.59

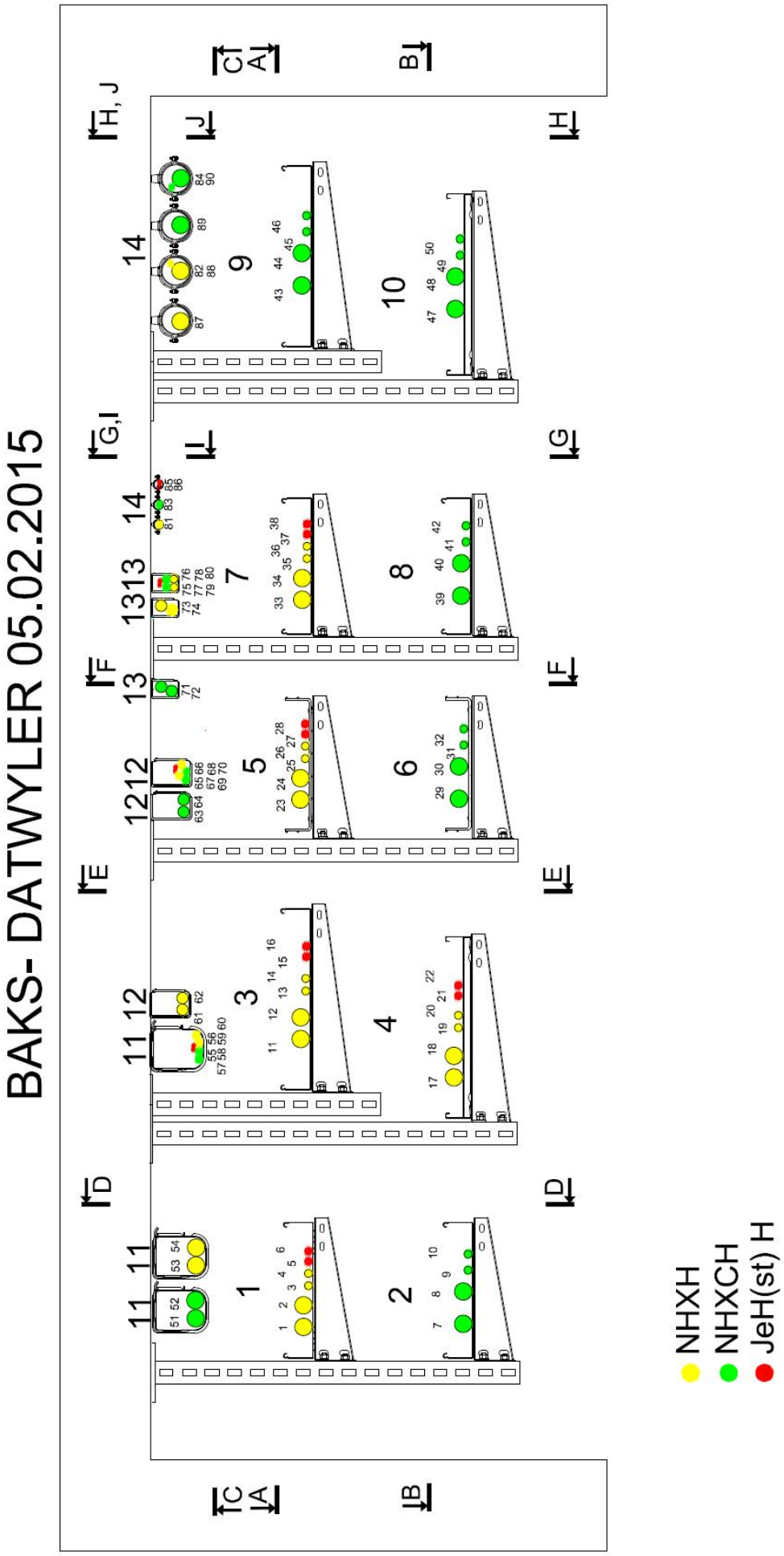
Additional dimensions available on request.

* System Circuit Integrity is dependent on installation method.

DRAWINGS



DRAWINGS



DRAWINGS

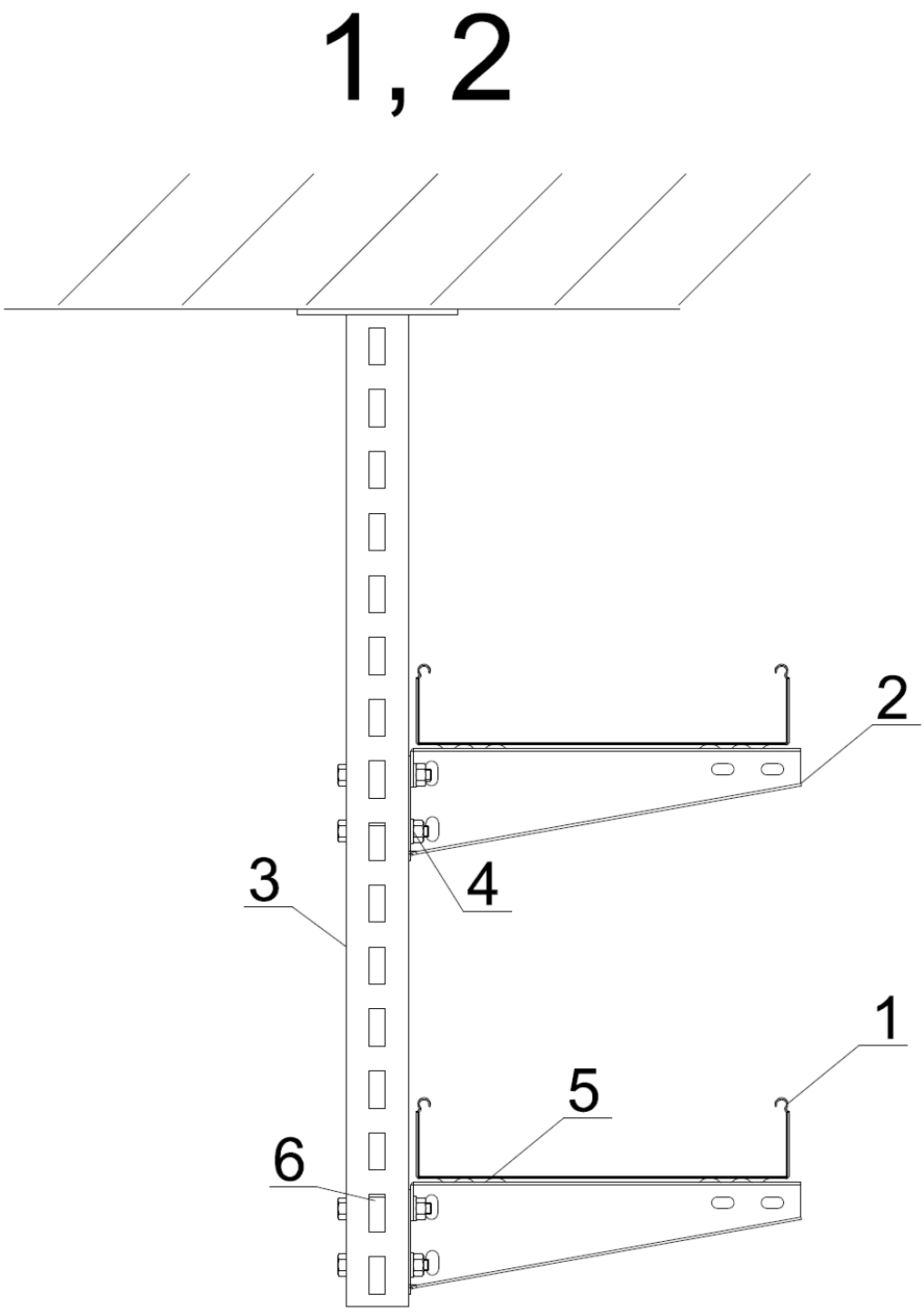
No	No FIRES	Cable type	Position	Description of construction
1	**34**	(N)HXH 4x50RM FE180 E90	1	Koryto kablowe KGL/KGOL300H60 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
2		(N)HXH 4x50RM FE180 E90		
3	**33**	(N)HXH 4x1,5RE FE180 E90		
4		(N)HXH 4x1,5RE FE180 E90		
5	**69**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
6	**68**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
7	**32**	(N)HXCH 4x50RM/25 FE180 E90	2	Koryto kablowe KGL/KGOL300H60 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
8		(N)HXCH 4x50RM/25 FE180 E90		
9	**31**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
10		(N)HXCH 4x1,5RE/1,5 FE180 E90		
11	**27**	(N)HXH 4x50RM FE180 E90	3	Koryto kablowe KGJ/KGOJ400H60 1.5 m /10kg/m / grubość blachy 0,9 mm Mocowanie: Podstawa WPCB500, Wysięgnik WWS/WWSO400
12		(N)HXH 4x50RM FE180 E90		
13	**26**	(N)HXH 4x1,5RE FE180 E90		
14		(N)HXH 4x1,5RE FE180 E90		
15	**65**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
16	**64**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
17	**25**	(N)HXH 4x50RM FE180 E90	4	Drabina kablowa DUD/DUOD400H60 1.5 m /10kg/m / grubość blachy 1,2 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO400
18		(N)HXH 4x50RM FE180 E90		
19	**24**	(N)HXH 4x1,5RE FE180 E90		
20		(N)HXH 4x1,5RE FE180 E90		
21	**63**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
22	**62**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
23	**19**	(N)HXH 4x50RM FE180 E90	5	Koryto kablowe KDS/KDSO300H60 1.5 m /10kg/m / Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
24		(N)HXH 4x50RM FE180 E90		
25	**18**	(N)HXH 4x1,5RE FE180 E90		
26		(N)HXH 4x1,5RE FE180 E90		
27	**59**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
28	**58**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
29	**17**	(N)HXCH 4x50RM/25 FE180 E90	6	Koryto kablowe KDS/KDSO300H60 1.5 m /10kg/m / Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
30		(N)HXCH 4x50RM/25 FE180 E90		
31	**16**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
32		(N)HXCH 4x1,5RE/1,5 FE180 E90		
33	**11**	(N)HXH 4x50RM FE180 E90	7	Koryto kablowe KFL300H60 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
34		(N)HXH 4x50RM FE180 E90		
35	**10**	(N)HXH 4x1,5RE FE180 E90		
36		(N)HXH 4x1,5RE FE180 E90		
37	**53**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
38	**52**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
39	**9**	(N)HXCH 4x50RM/25 FE180 E90	8	Koryto kablowe KFL300H60 1.5 m /10kg/m / grubość blachy 0,7 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO300
40		(N)HXCH 4x50RM/25 FE180 E90		
41	**8**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
42		(N)HXCH 4x1,5RE/1,5 FE180 E90		
43	**4**	(N)HXCH 4x50RM/25 FE180 E90	9	Koryto kablowe KGJ/400H60 1.5 m /10kg/m / grubość blachy 0,9 mm Mocowanie: Podstawa WPCB500, Wysięgnik WWS/WWSO400
44		(N)HXCH 4x50RM/25 FE180 E90		
45	**3**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
46		(N)HXCH 4x1,5RE/1,5 FE180 E90		
47	**2**	(N)HXCH 4x50RM/25 FE180 E90	10	Drabina kablowa DUD/DUOD400H60 1.5 m /10kg/m / grubość blachy 1,2 mm Mocowanie: Podstawa WPCB800, Wysięgnik WWS/WWSO400
48		(N)HXCH 4x50RM/25 FE180 E90		
49	**1**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
50		(N)HXCH 4x1,5RE/1,5 FE180 E90		

DRAWINGS

No	No FIRES	Cable type	Position	Description of construction
51	**36**	(N)HXCH 4x50RM/25 FE180 E90	11	Obejma kablowa OZO. Mocowanie co 600mm /6 kg/m
52		(N)HXCH 4x50RM/25 FE180 E90		
53	**35**	(N)HXH 4x50RM FE180 E90		
54		(N)HXH 4x50RM FE180 E90		
55	**30**	(N)HXH 4x1,5RE FE180 E90		
56		(N)HXH 4x1,5RE FE180 E90		
57	**29**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
58		(N)HXCH 4x1,5RE/1,5 FE180 E90		
59	**67**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
60	**66**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
61	**28**	(N)HXH 5x16RM FE180 E90	12	Obejma kablowa OZSO. Mocowanie co 600mm /2 kg/m
62		(N)HXH 5x16RM FE180 E90		
63	**23**	(N)HXCH 4x16RM/16 FE180 E90		
64		(N)HXCH 4x16RM/16 FE180 E90		
65	**22**	(N)HXH 4x1,5RE FE180 E90		
66		(N)HXH 4x1,5RE FE180 E90		
67	**21**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
68		(N)HXCH 4x1,5RE/1,5 FE180 E90		
69	**61**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
70	**60**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
71	**20**	(N)HXH 5x16RM FE180 E90	13	Obejma kablowa OZMO. Mocowanie co 600mm/1 kg/m
72		(N)HXH 5x16RM FE180 E90		
73	**15**	(N)HXCH 4x16RM/16 FE180 E90		
74		(N)HXCH 4x16RM/16 FE180 E90		
75	**13**	(N)HXH 4x1,5RE FE180 E90		
76		(N)HXH 4x1,5RE FE180 E90		
77	**14**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
78		(N)HXCH 4x1,5RE/1,5 FE180 E90		
79	**56**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
80	**57**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
81	**12**	(N)HXH 4x1,5RE FE180 E90	14	Rury stalowe o średnicy wewnętrznej fi 16-63. Mocowanie za pomocą obejm co 1500 mm.
82		(N)HXH 4x1,5RE FE180 E90		
83	**6**	(N)HXCH 4x1,5RE/1,5 FE180 E90		
84		(N)HXCH 4x1,5RE/1,5 FE180 E90		
85	**55**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
86	**54**	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90		
87	**7**	(N)HXH 4x50RM FE180 E90		
88		(N)HXH 4x50RM FE180 E90		
89	**5**	(N)HXCH 4x50RM/25 FE180 E90		
90		(N)HXCH 4x50RM/25 FE180 E90		

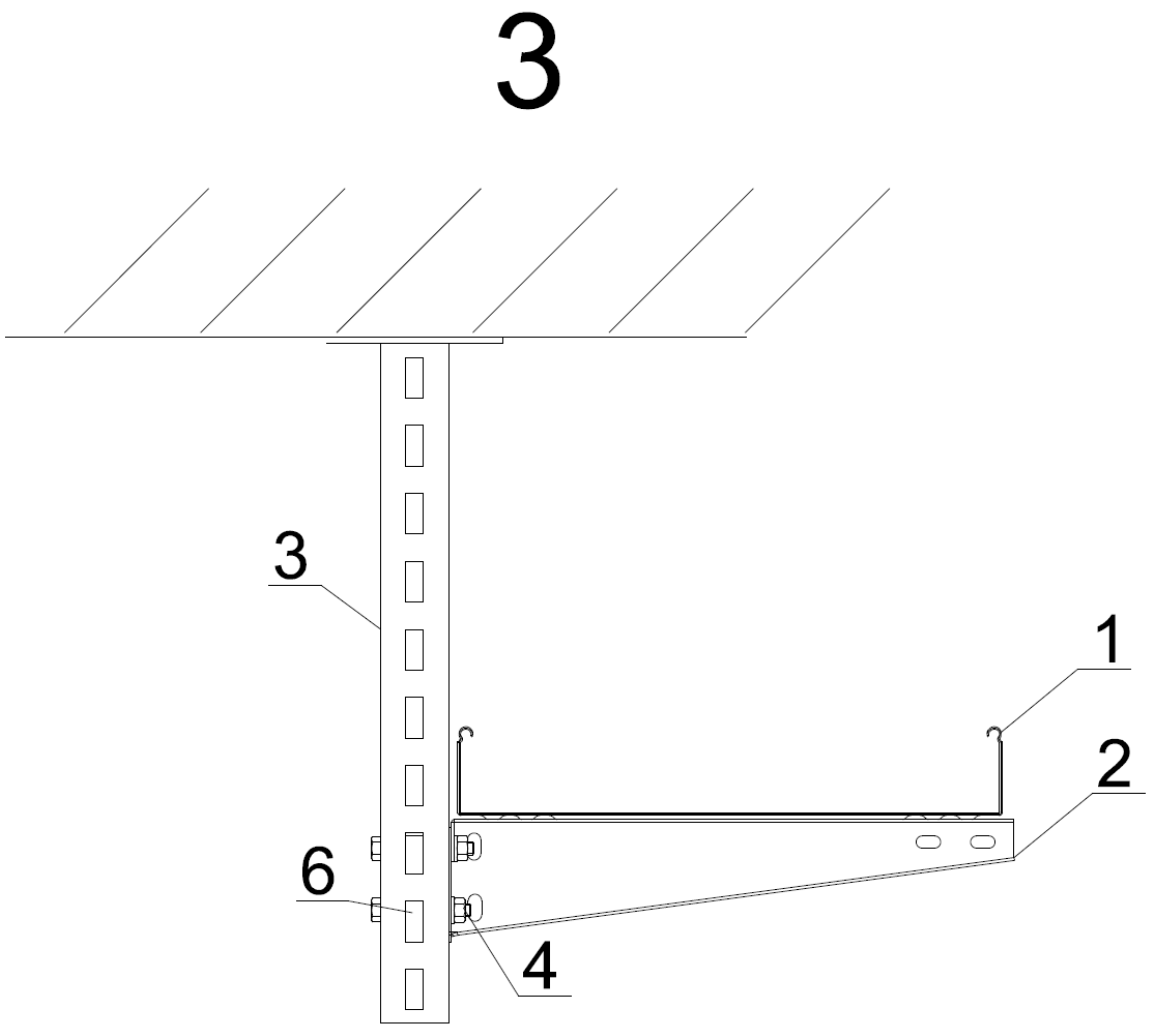
No	Cable type	Cable diameter (approx.)	Cable weight [kg/m], approx.	Amount
1	(N)HXH 4x50RM FE180 E90	32,8 mm	2,8	14
2	(N)HXH 5x16RM FE180 E90	22,1 mm	1	4
3	(N)HXH 4x1,5RE FE180 E90	12,4 mm	0,25	18
4	(N)HXCH 4x50RM/25 FE180 E90	36,0 mm	3,2	14
5	(N)HXCH 4x16RM/16 FE180 E90	25,3 mm	1	4
6	(N)HXCH 4x1,5RE/1,5 FE180 E90	14,1 mm	0,3	18
8	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	6,5 mm	0,058	18
			TOTAL	90

DRAWINGS



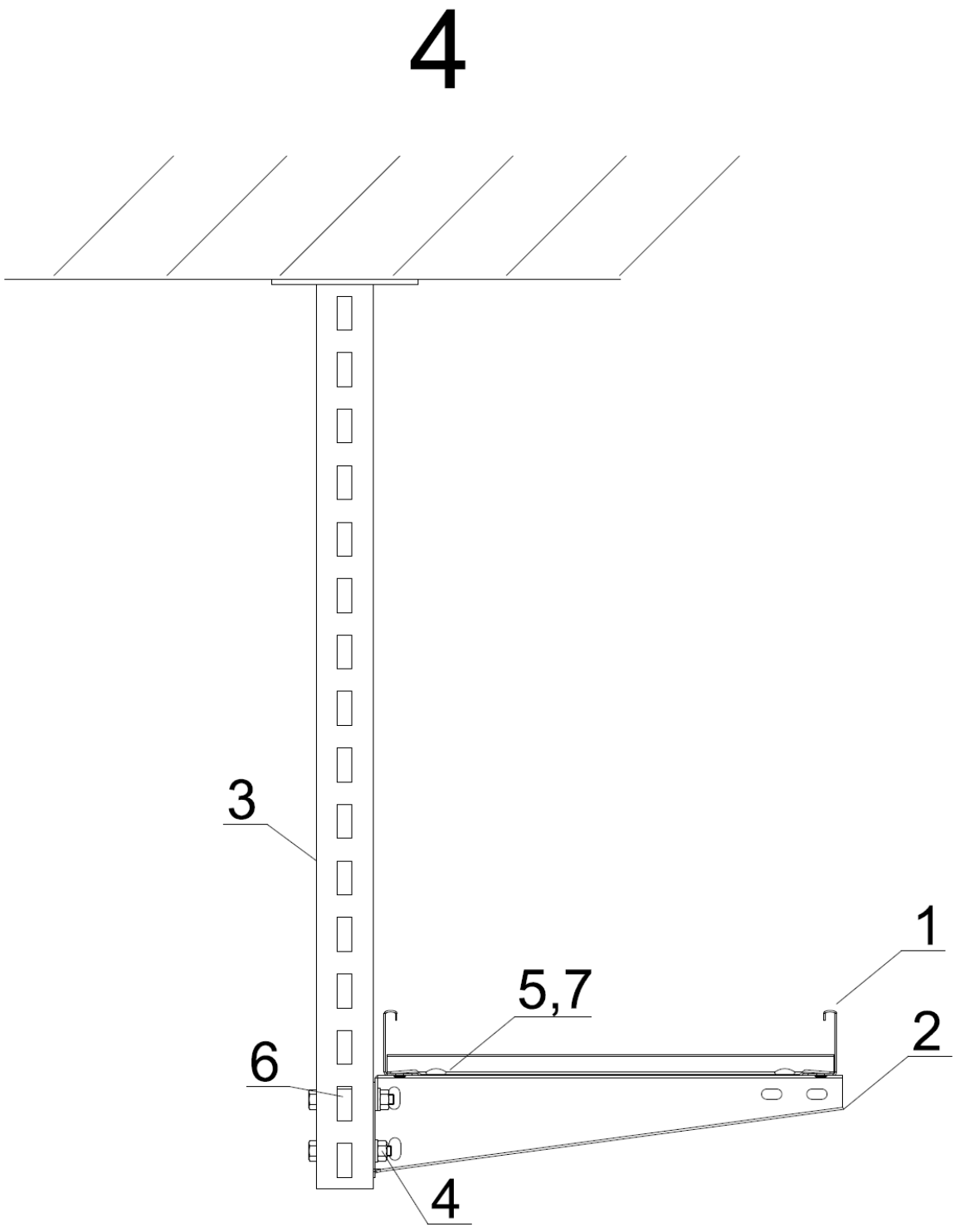
L.p.	Nazwa	Symbol	Szt.
6	Blacha rozporowa	BR55	2
5	Śruba	SGKM6x12	4
4	Śruba + podkł.powiększ.	SMM10x80 + PW10	4
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO300	2
1	Koryto	KGL/KGOL300H60	2

DRAWINGS



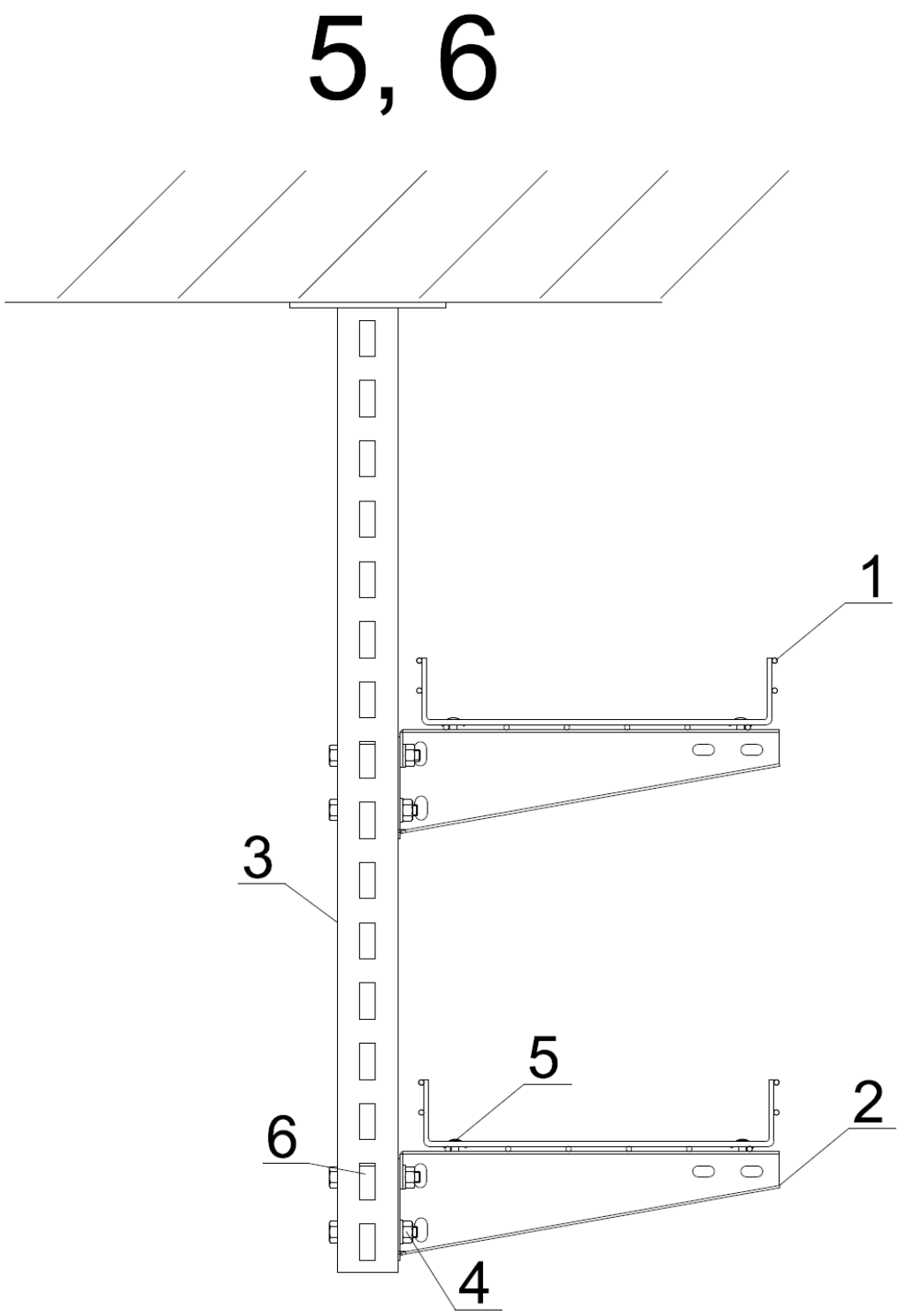
L.p.	Nazwa	Symbol	Szt.
6	Blacha rozporowa	BR55	1
5	Śruba	SGKM6x12	2
4	Śruba + podkł. powiększ.	SMM10x80 + PW10	2
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO400	1
1	Koryto	KGJ/KGOJ400H60	1

DRAWINGS



L.p.	Nazwa	Symbol	Szt.
7	Zacisk mocujący	ZM	2
6	Blacha rozporowa	BR55	1
5	Śruba	SGKM8x14	2
4	Śruba + podkł. powiększ.	SMM10x80 + PW10	2
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO400	1
1	Drabina	DUD400H60	1

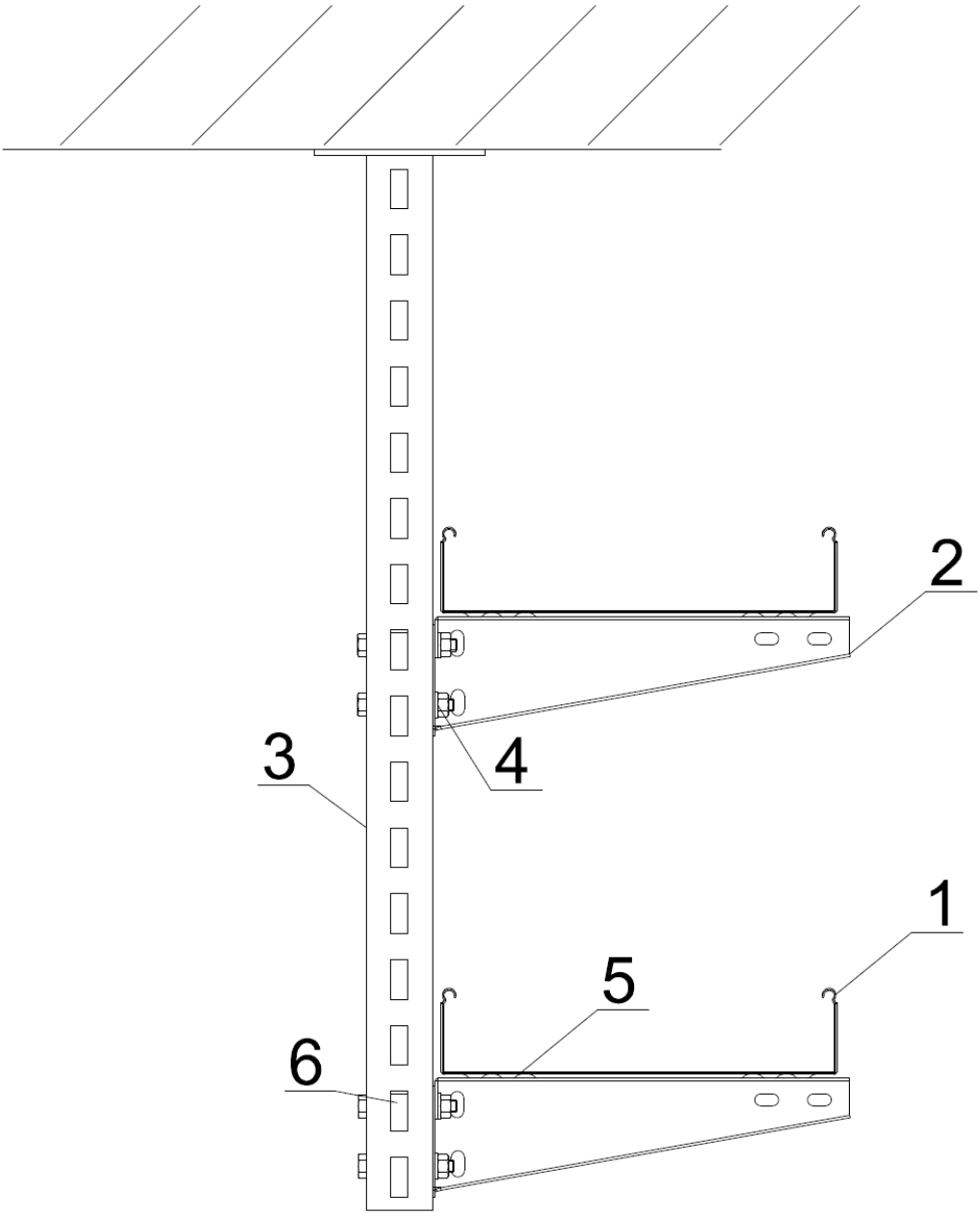
DRAWINGS



L.p.	Nazwa	Symbol	Szt.
6	Blacha rozporowa	BR55	2
5	Zacisk śrubowy	ZSO	4
4	Śruba + podkł. powiększ.	SMM10x80 + PW10	4
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO300	2
1	Koryto siatkowe	KDS/KDSO300H60	2

DRAWINGS

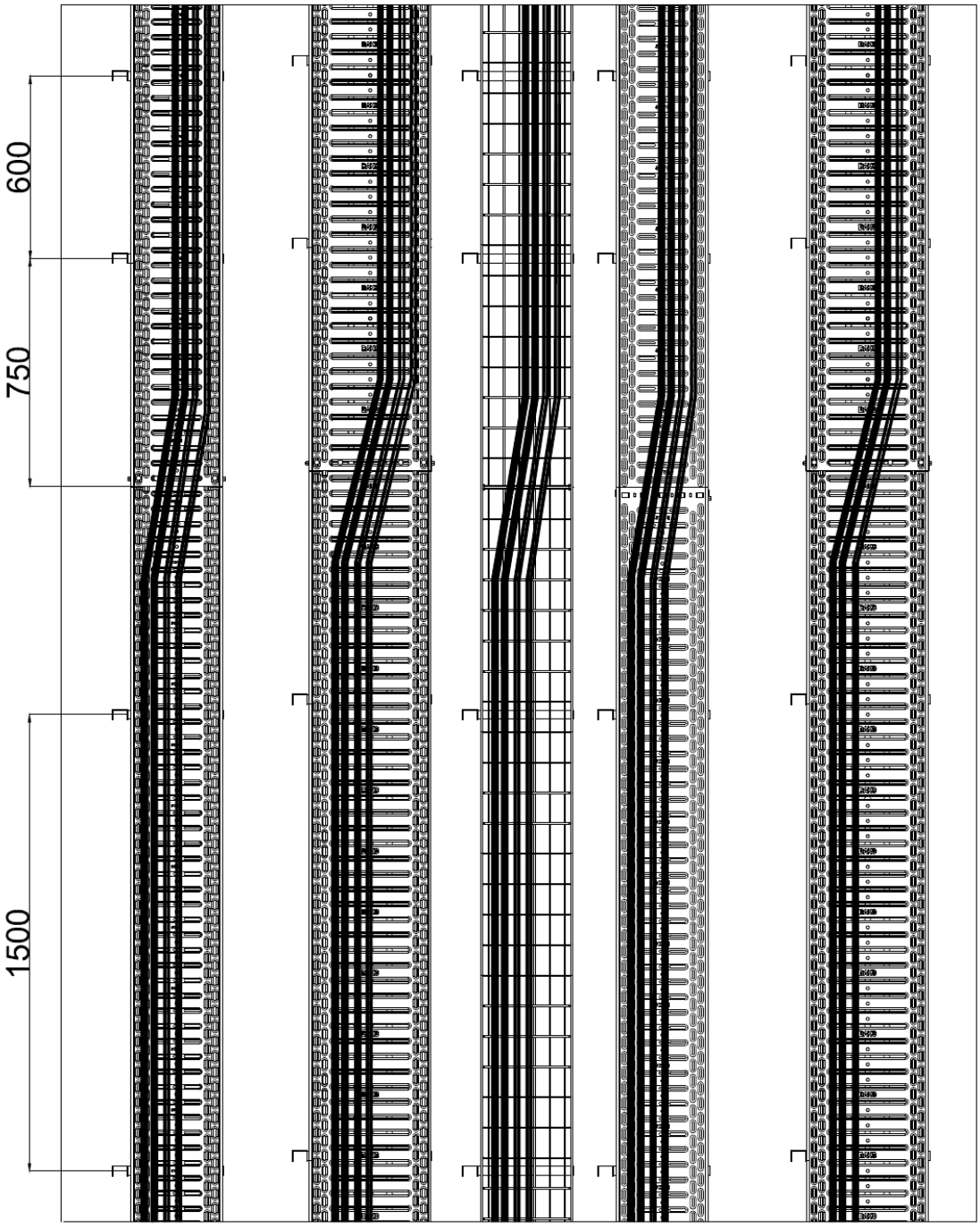
7, 8



L.p.	Nazwa	Symbol	Szt.
6	Blacha rozporowa	BR55	2
5	Śruba	SGKM6x12	4
4	Śruba + podkł. powieksz.	SMM10x80 + PW10	4
3	Wspornik sufitowy	WPCB...	1
2	Wysięgnik	WWS/WWSO300	2
1	Koryto	KFL300H60	2

DRAWINGS

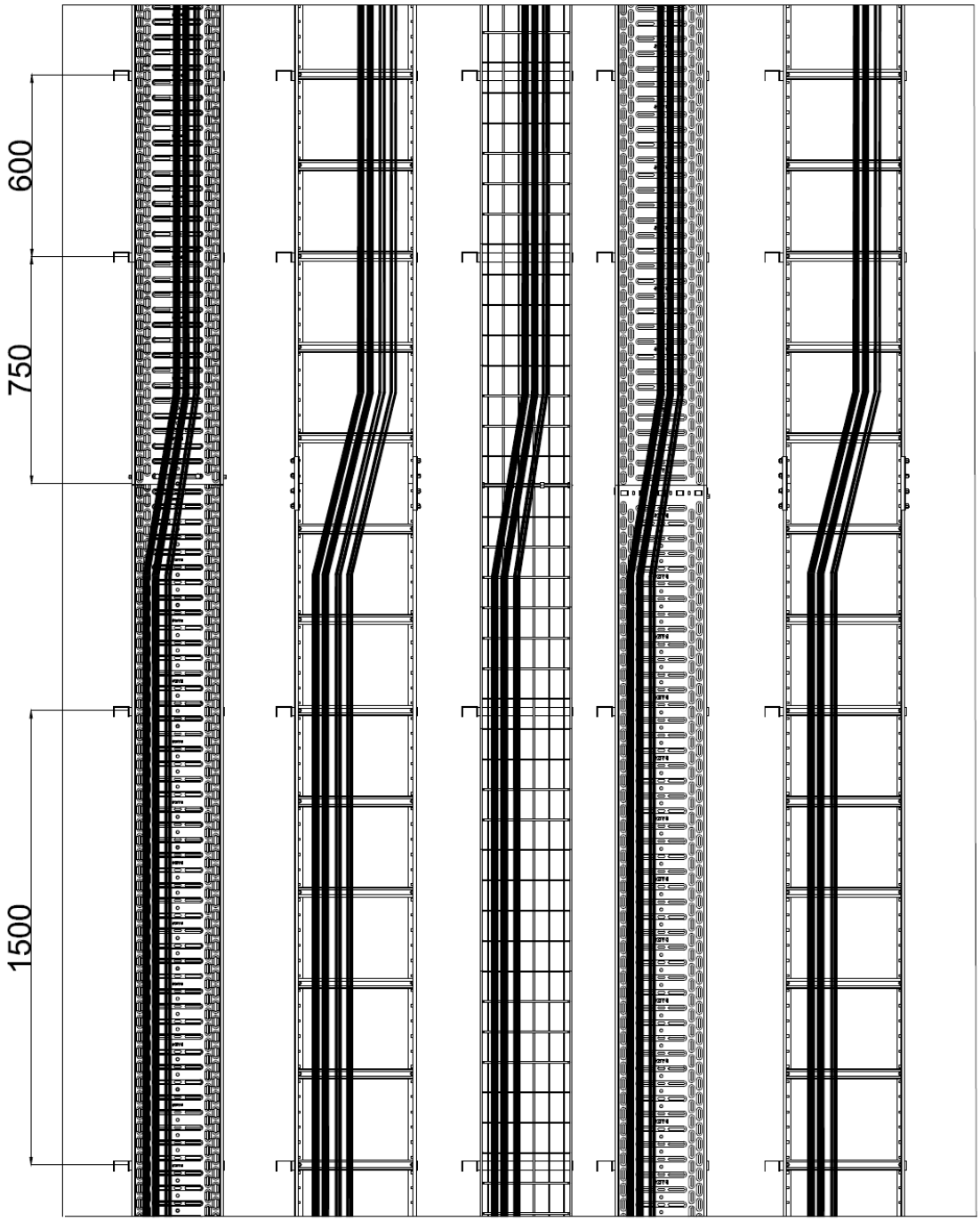
A-A



BAKS - DATWYLER 2015.02.05

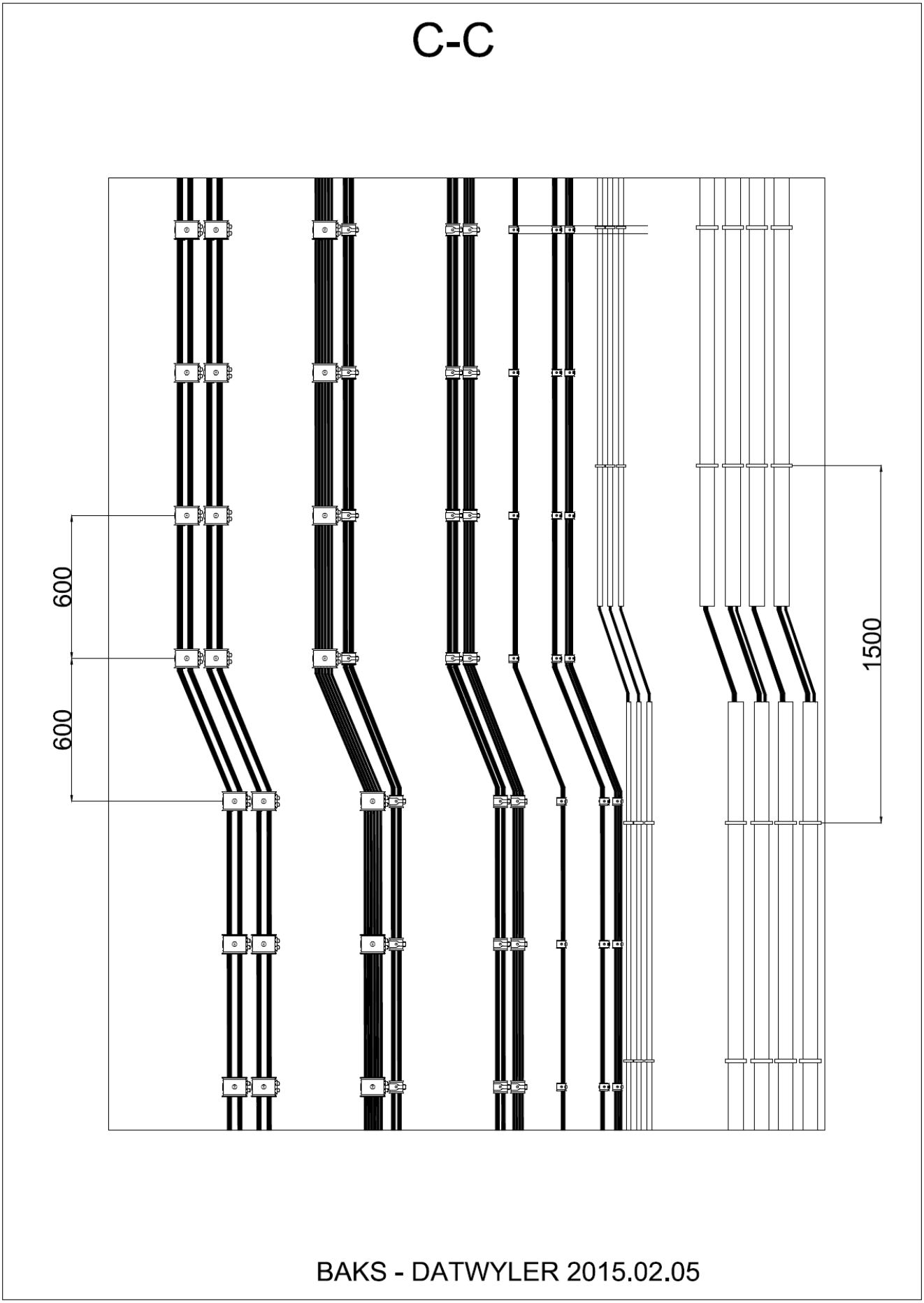
DRAWINGS

B-B



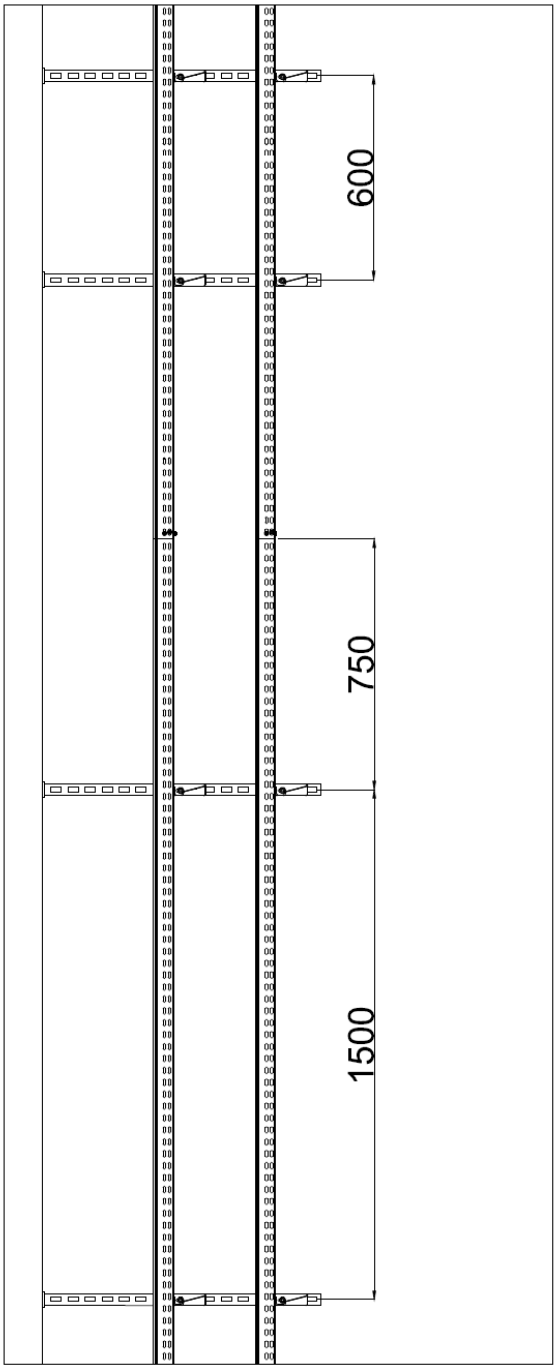
BAKS - DATWYLER 2015.02.05

DRAWINGS



DRAWINGS

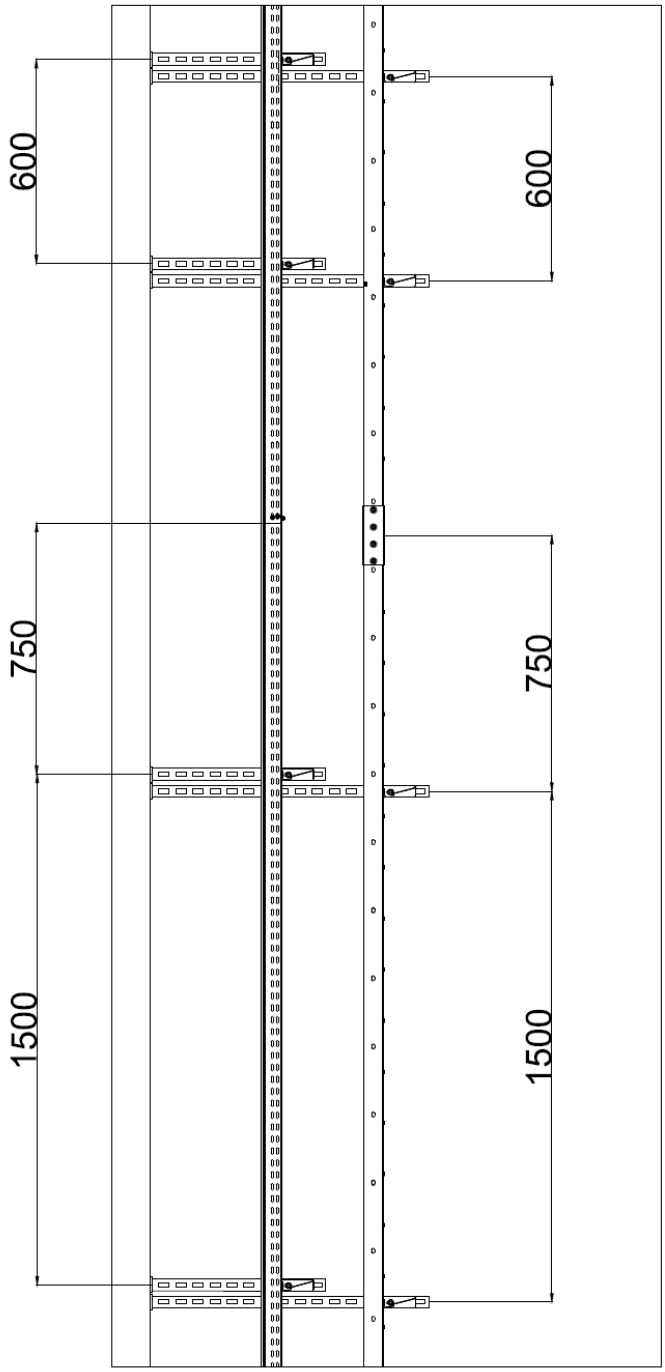
D-D



BAKS - DATWYLER 2015.02.05

DRAWINGS

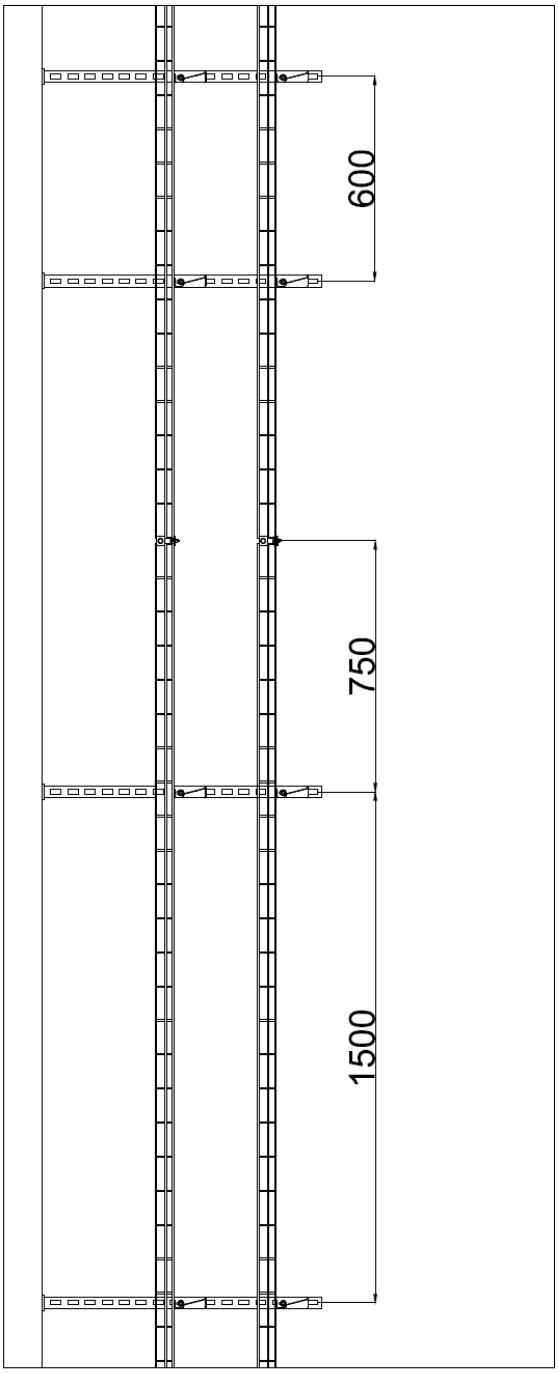
E-E



BAKS - DATWYLER 2015.02.05

DRAWINGS

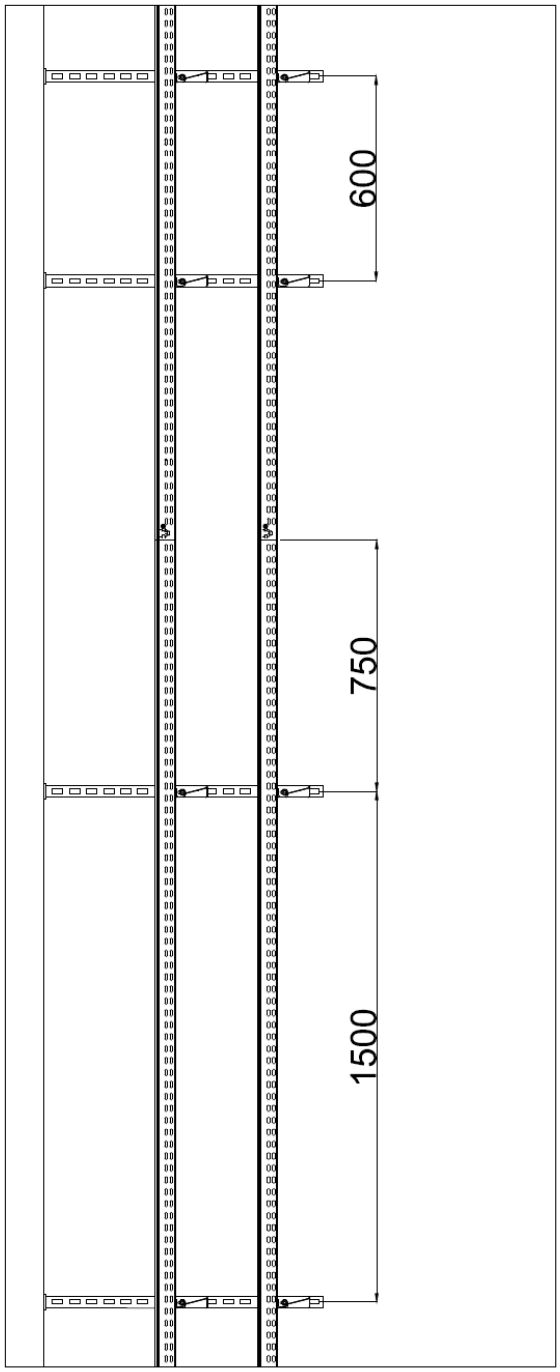
F-F



BAKS - DATWYLER 2015.02.05

DRAWINGS

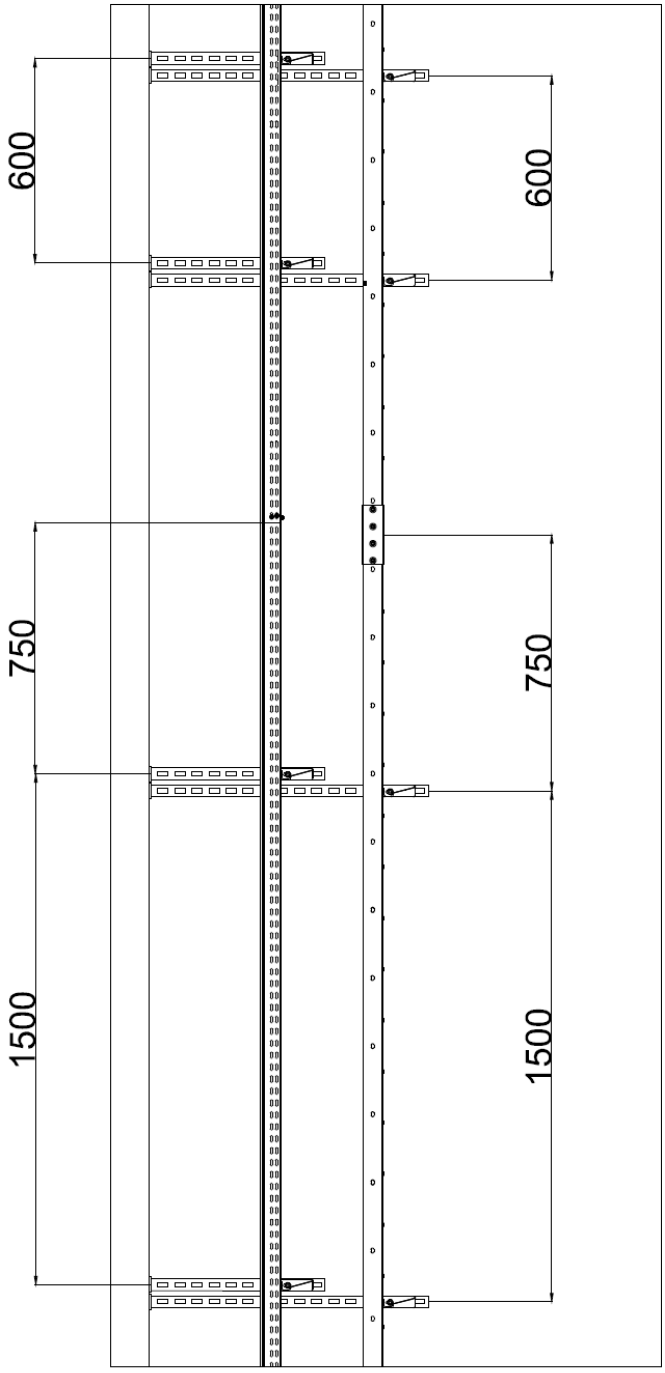
G-G



BAKS - DATWYLER 2015.02.05

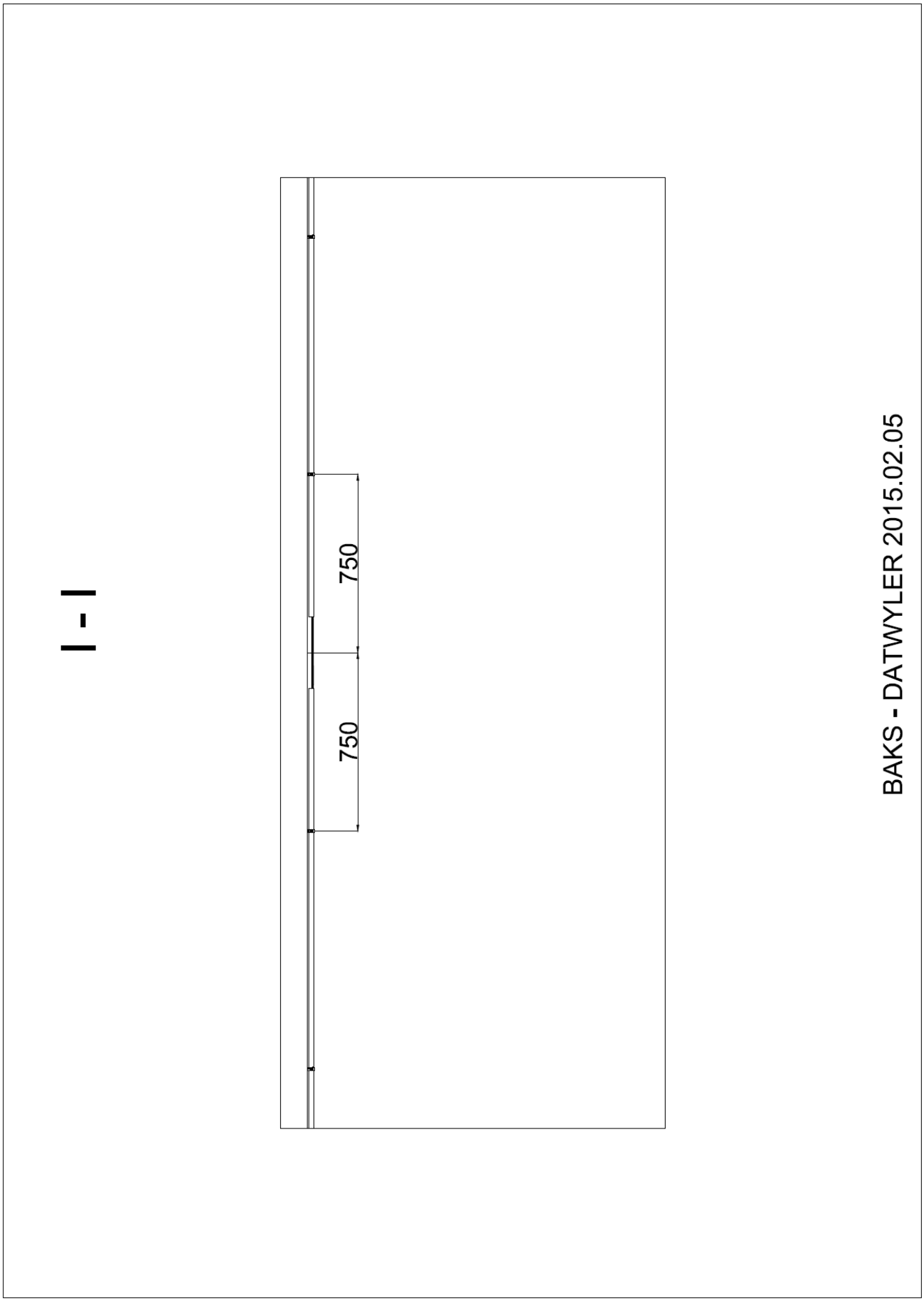
DRAWINGS

H-H



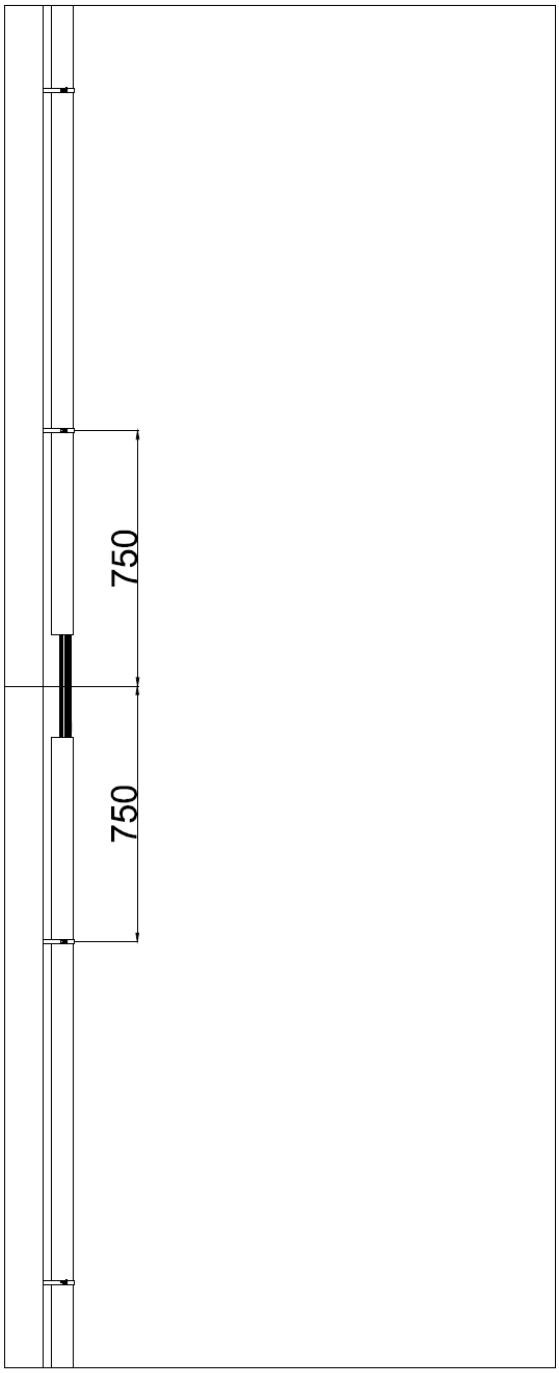
BAKS - DATWYLER 2015.02.05

DRAWINGS



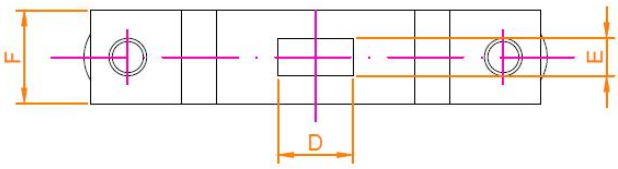
DRAWINGS

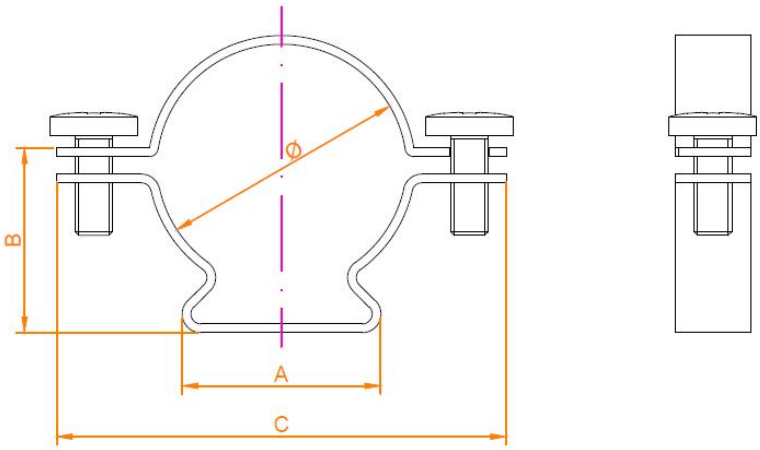
J - J



BAKS - DATWYLER 2015.02.05

DRAWINGS





Wszystkie wymiary w milimetrach [mm]

Symbol	Nr. kat.	Ø	A	B	C	D	E	F	G
OBS 16	800187	16-19,5	23	21,5	44	10	6	13	M5x15
OBS 20	800287	20-23,5	27	23,5	50	10	6	13	M5x15
OBS 25	800387	23,5-26	27	24	50	10	6	13	M5x15
OBS 30	800487	26,5-33	28	29,5	60	12	6	15	M5x20
OBS 40	800587	35-40	33	36,5	76	12	6	18	M5x20
OBS 50	800687	43-50	38	44	89	14	8	18	M5x20
OBS 60	800787	54-63	38	46,5	99	14	8	18	M5x20

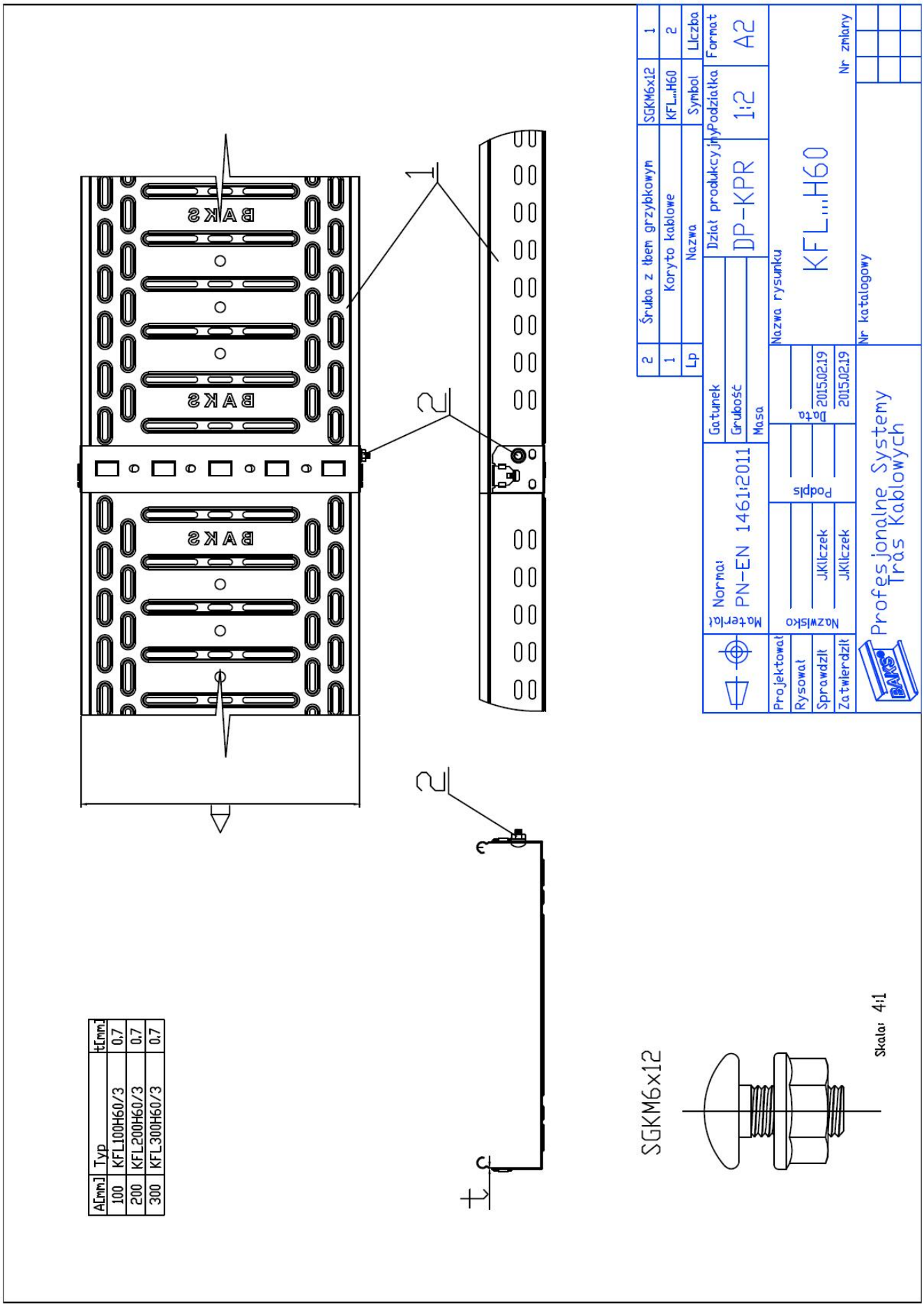
Materiał	Norma: PN-EN 1461:2011	Gatunek -	Dział produkcyjny	Podziałka 1:1	Format A4
		Grubość 2 mm			
		Masa -			

Projektował	Nazwisko	Podpis	Data	Nazwa rysunku
Rysował	Winiarczyk Ł.		2015.02.19	OBS
Sprawdził	Żukowski T.		2015.02.19	
Zatwierdził	Kliczek J.		2015.02.19	Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr katalogowy

DRAWINGS


BAKS
1
2
2
SGKM6x12
Skala: 4:1
A[mm] Typ tt[mm]
100 KFL100H60/3 0.7
200 KFL200H60/3 0.7
300 KFL300H60/3 0.7
2 Śruba z łbem grzybkowym SGKM6x12 1
1 Koryto kablowe KFL...H60 2
Lp Nazwa Symbol Liczba
Dział produkcyjny Podziałka Format
DP-KPR 1:2 A2
KFL...H60
Nr katalogowy
Nr zmiany
Nazwa rysunku
Gatunek
Grubość
Masa
Materiał
Norma: PN-EN 1461:2011
Projektował
Rysował JKliczek 2015.02.19
Sprawdził JKliczek 2015.02.19
Zatwierdził
Nazwisko Podpis Data
Profesjonalne Systemy Tras Kablowych

8. FINAL PROVISION

§ This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in EN 1363-1, and where appropriate STN 92 0205. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

§ Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

§ The test results refer only to the tested subjects. This test report is not an approval of the tested product by the test laboratory or the accreditation body overseeing the laboratory's activities. The test was carried out on testing equipment that is the property of FIRES, s.r.o., Batizovce. Without the written permission of the test laboratory this test report may be copied and/or distributed only as the whole. Any modifications of the test report can be made only by the fire resistance test laboratory FIRES, s.r.o., Batizovce.

Approved by:

Ing. Štefan Rástocký
leader of the testing laboratory

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

Prepared by:

Bc. Dávid Šubert
technician of the testing laboratory

9. NORMATIVE REFERENCES

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

THE END OF THE TEST REPORT