FIRES
The Experts On Fire Safety

TEST REPORT FIRES-FR-121-10-AUNE

Cable bearing system BAKS with cables business TECHNOKABEL

Reg. No. 041/S-159

The Experts on Fire Safety

TEST REPORT

FIRES-FR-121-10-AUNE

Tested property:	Function in fire
Test method:	DIN 4102 – 12:1998-11
Date of issue:	30. 07. 2010
Name of the product:	Cable bearing system BAKS with cables business TECHNOKABEL
Manufacturer:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland - producer of construction TECHNOKABEL S.A., Nasielska 55, 04-343 Warszawa, Poland – producer of cables
Sponsor:	BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew, Poland
Task No.:	PR-10-0189
Specimen received:	25. 06. 2010
Date of the test:	01. 07. 2010

Technician responsible for the technical side of this report: Miroslav Hudák

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Test reports:	5	Copy No.:	2

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1. INTRODUCTION

This test report contains the results of test carried out by testing laboratory of FIRES, s.r.o. in Batizovce. The purpose of the test was acquirement of information for product classification.

Representative from the sponsor's side witnessing the test:

Mr. Jacek Kliczek	BAKS Kazimierz Sielski
Mr. Mariusz Kwiatkowski	TECHNOKABEL S.A.
Mr. Pavel Stradomski	TECHNOKABEL S.A.

test directed by	Bc. Marek Gorlický
test carried out by	Miroslav Hudák
operator	Alexander Reľovský

2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 004	Vertical test furnace for fire resistance testing	-
F 69 005	PLC system for data acquisition and control TECOMAT NS 950	-
F 40 008	SW Control Web 2000	-
F 40 009	Control and communication software to PLC TECOMAT NS 950	-
F 40 010	Visual and calculating software to PLC TECOMAT NS 950	-
F 40 011	Driver Tecomat – CW 2000 (SW)	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	climatic conditions measuring
F 71 008, F 71 009	Transducer of differential pressure (–50 to + 150) Pa	pressure inside the test furnace
F 08 521 - F 08 528	Plate thermometers	temperature inside the test furnace, according to EN 1363-1
F 08 701	Sheathed thermocouple type K Ø 3 mm	ambient temperature
F 54 020	Digital calliper (0 to 200) mm	-
F 54 059	Racking meter	-
F 57 007	Digital stop-watch	-
F 96 015	Test signal panel	-

3. PREPARATION OF THE SPECIMEN

Testing laboratory didn't take off individual components of the specimen. 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 businesses BAKS Kazimierz Sielski and TECHNOKABEL S.A..

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing system BAKS Kazimierz Sielski – cable trays, mesh cable tray cable ladders, cable clips UDF and UKO1 with accessories and power and communication non-halogen cables made by TECHNOKABEL S.A..

Cables

Used cables by test:	(N)HXH-J FE180 PH30/E30 4x1,5 RE	(4 x)
	(N)HXH-J FE180 PH30/E30 4x50 RM	(4 x)
	(N)HXH-J FE180 PH90/E90 4x1,5 RE	(8 x)
	(N)HXH-J FE180 PH90/E90 4x50 RM	(8 x)
	(N)HXHX-J FE180 PH90/E90 4x1,5 RE	(4 x)
	(N)HXHX-J FE180 PH90/E90 4x50 RM	(4 x)
	(N)HXCH FE180 PH90/E90 4x1,5/1,5 RE	(8 x)
	(N)HXCH FE180 PH90/E90 4x50/25 RM	(8 x)
	NHXH-J FE180 PH90/E90 4x1,5 RE	(12 x)
	NHXH-J FE180 PH90/E90 4x10 RE	(2 x)
	NHXH-J FE180 PH90/E90 4x50 RM	(10 x)
	NHXCH FE180 PH90/E90 4x1,5 /1,5 RE	(6 x)
	NHXCH FE180 PH90/E90 4x10/10 RM	(2 x)
	NHXCH FE180 PH90/E90 4x50/25 RM	(6 x)
	HDGszo FE180 PH90/E30-E90 3x1,5 RE	(16 x)
	HLGs FE180 PH90/E30-E90 2x1,0 mm^2	(6 x)
	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	(10 x)
	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm	(2 x)

The length of cables was 5 m, length of 3,5 m was exposed to fire.

Cables were not fixed to the steel sheet trays and mesh trays in the points of allowed bending radius by steel clips.

Cables were fixed to the ladders in the points of allowed bending radius by steel clips (type UKO1 according to the cable diameter).

Loadbearing system consisted of cable tracks 4,5 m long and of ceiling installation (steel members made of galvanized steel). Length of trays exposed to fire was 3,5 m.

Suspension track No. 1 and 11
Suspension was made by three consoles combined of hanger (type WPTO 400) and support hangers (type PWO 400). Hangers were fixed by dowel (type PSRO M10x80) to wall in spacing of 1500 mm. Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at hangers and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12).

Suspension track No. 2 and 12
Suspension was made by three consoles combined of hanger (type WPTO 400) and support hangers (type PWO 400). Hangers were fixed by dowel (type PSRO M10x80) to wall in spacing of 1500 mm. Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at hangers by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14).

Suspension tracks No. 3, 4 and 5
Suspensions were made by three consoles combined of one hanger (type WFLO 600) which was fixed to ceiling by one dowels (type PSRO M10x90) in spacing of 1500 mm and three hangers (type WFLO 400). Hangers were fixed by screws M10x30 and threaded bar (type PGM10/1x600) with washers and nuts M10 to ceiling by dowel (type TRSO M10x40). Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at upper and horizontal hangers and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at under hangers by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14.

Suspension track No. 6 and 7
Suspension was made by three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 which were fixed to ceiling by two dowels (type TRSO M10x40) in spacing of 1500 mm. Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm) were fixed at upper supports and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12).Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at under supports by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14).

Suspension track No. 8
Suspension was made by three hangers (type WFCO 400) which were fixed to ceiling by one dowels (type PSRO M10x80) in spacing of 1500 mm. Hangers were fixed by threaded bar (type PGM8/1x300) with washers and nuts M8 to ceiling by dowel (type TRSO M8x30). Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at hangers by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14).

Suspension tracks No. 9 and 10
Suspensions were made by three consoles combined of one hanger (type WFLO 500) which was fixed to ceiling by one dowels (type PSRO M10x90) in spacing of 1500 mm and two hangers (type WFLO 400). Hangers were fixed by screws M10x30 and threaded bar (type PGM10/1x600) with washers and nuts M10 to ceiling by dowel (type TRSO M10x40). Mesh trays (type KDSO 400H60/3, steel wire Ø 4,5 mm) were fixed at hangers and jointed together by junctions (type USSO) and (type USSPWO).

Ceiling installation
Ceiling ledges (type SDOP 500) were fixed to ceiling by dowels (type SRO M6x30) in spacing of 600 mm, cables were fixed to ledges by clips (type UKO1) in spacing of 600 mm.
Clips (type UDF) were fixed to ceiling by dowels (type HILTI X-U19MX) in spacing of 600 mm. Cable clips were depending on the diameter of cables.
Two boxes WKE 54 (producer Spelsberg) were fixed to ceiling by dowels (type SRO M6x30) with cables which were fixed to ceiling by clips UDF with dowels (type SRO M6x30) in spacing of 600 mm.

Wall installation
Two boxes WKE 54 (producer Spelsberg) were fixed to the left wall by dowels (type SRO M6x30) with cables which were fixed to wall by clips UDF with dowels (type SRO M6x30) in spacing of 600 mm.
Two boxes WKE 54 (producer Spelsberg) were fixed to the right wall by dowels (type SRO M6x30) with cables which were fixed to wall by clips UDF with dowels (type SRO M6x30) in spacing of 600 mm.

Trays were loaded with 10 kg/m and mesh trays ladders were loaded with 20 kg/m.
Types of individual components are from catalogue BAKS.
Cable penetration through the wall of test furnace was sealed by mineral wool Rockwool.
Loading with steel chain were 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 SPECIMEN FIXATION

The test specimen was fixed on the ceiling of the test furnace which was created from concrete panels made of common shocked concrete of class B 20, 150 mm thick.
The type of specimen fixation into the test furnace is visible in drawing documentation and it was selected by the sponsor.

4.3 INSPECTION OF SPECIMEN

Before and after the function in fire test, conformity of drawings and test specimen was checked. Specimen corresponded to the drawings which create the appendix of this test report. Inspection of specimen consisted of visual review of the test specimen, used materials as well as size verification (number and cross sections of conductors, thickness, measurements of cables and trays) and also the way of specimen fixation to supporting construction was subject of inspection.

4.4 CLIMATIC CONDITIONING OF SPECIMEN

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

Ambient air temperature [°C]

mean	23,6
standard deviation	0,3

Relative air humidity [%]

mean	46,6
standard deviation	3,3

The humidity equilibrium state of test specimen was not determined. The test specimen did not comprise hygroscopic material.

5. CARRYING OUT OF THE TEST

5.1 TEST GENERALLY

The test was carried out in horizontal test furnace with dimensions (3500 x 3000 x 2750) 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 and 4102-2 during the test. Detailed information is shown in appendices of this report, or in Quality records of the testing laboratory.

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

Date of the test	Relative air humidity [%]	Ambient air temperature [°C]
01. 07. 2010	62,6	19,7

5.3 RESULTS OF THE TEST

Measured values are stated in appendices of this test report.

5.4 EVALUATION OF THE TEST

Specimen No.	Cables	Time to first failure / interruption of conductor
1	2 cables NHXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
2	2 cables NHXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
3	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
4	cable NHXH-J FE180 PH90/E90 4x10 RE with Firebox WKE 54	120 minutes no failure / interruption
5	cable NHXH-J FE180 PH90/E90 4x1,5 RE with Firebox WKE 54	120 minutes no failure / interruption
6	2 cables NHXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
7	2 cables NHXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
8	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
9	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
10	2 cables (N)HXHX-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
11	2 cables (N)HXHX-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption

Specimen No.	Cables	Time to first failure / interruption of conductor
12	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE	111 minutes
13	2 cables (N)HXHX-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
14	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
15	2 cables (N)HXHX-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
16	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE	120 minutes no failure / interruption
17	2 cables NHXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
18	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
19	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
20	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
21	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM	120 minutes no failure / interruption
22	2 cables (N)HXH-J FE180 PH30/E30 4x1,5 RE	68 minutes
23	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM	120 minutes no failure / interruption
24	2 cables (N)HXH-J FE180 PH30/E30 4x1,5 RE	120 minutes no failure / interruption
25	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
26	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE	120 minutes no failure / interruption
27	2 cables NHXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
28	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
29	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
30	cable (N)HXH-J FE180 PH90/E90 4x50 RM	79 minutes
31	cable (N)HXH-J FE180 PH90/E90 4x50 RM	95 minutes
32	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
33	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE	120 minutes no failure / interruption
34, 35	2 cables NHXCH FE180 PH90/E90 4x50/25 RM	120 minutes no failure / interruption
36	cable NHXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
37	cable NHXH-J FE180 PH90/E90 4x50 RM	116 minutes
38	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
39	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE	120 minutes no failure / interruption
40	cable NHXCH FE180 PH90/E90 4x10/10 RM with Firebox WKE 54	85 minutes
41	cable NHXCH FE180 PH90/E90 4x10/10 RM with Firebox WKE 54	110 minutes
42	cable (N)HXH-J FE180 PH90/E90 4x50 RM	42 minutes
43	cable (N)HXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
44	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
45	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE	120 minutes no failure / interruption
46	cable NHXH-J FE180 PH90/E90 4x10 RE with Firebox WKE 54	120 minutes no failure / interruption
47	cable NHXH-J FE180 PH90/E90 4x1,5 RE with Firebox WKE 54	120 minutes no failure / interruption
48, 49	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM	120 minutes no failure / interruption
50	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE	120 minutes no failure / interruption
51	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE	120 minutes no failure / interruption
52	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
53	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
54	2 cables HLGs FE180 PH90/E30-E90 2x1,0 mm^2	120 minutes no failure / interruption
55	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
56	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption
57	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption
58	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption
59	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
60A	cable HDGszo FE180 PH90/E30-E90 3x1,5 RE	45 minutes
60B	cable HDGszo FE180 PH90/E30-E90 3x1,5 RE	94 minutes
61A	cable HLGs FE180 PH90/E30-E90 2x1,0 mm^2	42 minutes
61B	cable HLGs FE180 PH90/E30-E90 2x1,0 mm^2	32 minutes
62	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
63	2 cables HLGs FE180 PH90/E30-E90 2x1,0 mm^2	120 minutes no failure / interruption
64	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
65	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption
66	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE	120 minutes no failure / interruption
67	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption
68	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm	120 minutes no failure / interruption

The fire test was discontinued in 122nd minute at the request of test sponsor.

The test continued since 91st minute at constant temperature 1007 °C according to request of sponsor.

Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S68 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.
Circuit breakers with rating 3 A were used.

6. CLOSING

§ 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 DIN 4102-2. 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.

Issued by:

Ing. Štefan Rástocký
leader of the testing laboratory

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-1-

Responsible for the technical side of the test report:

Miroslav Hudák
technician of the testing laboratory

7. NORMATIVE REFERENCES

STN EN 1363-1: 2001	Fire resistance tests. Part 1: General requirements
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

8. LIST OF APPENDICES

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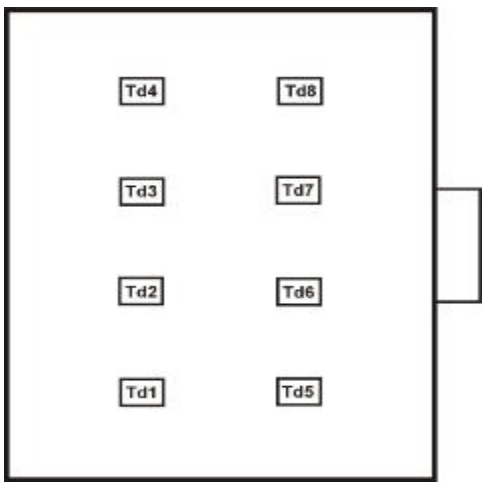
Measured values inside the test furnace

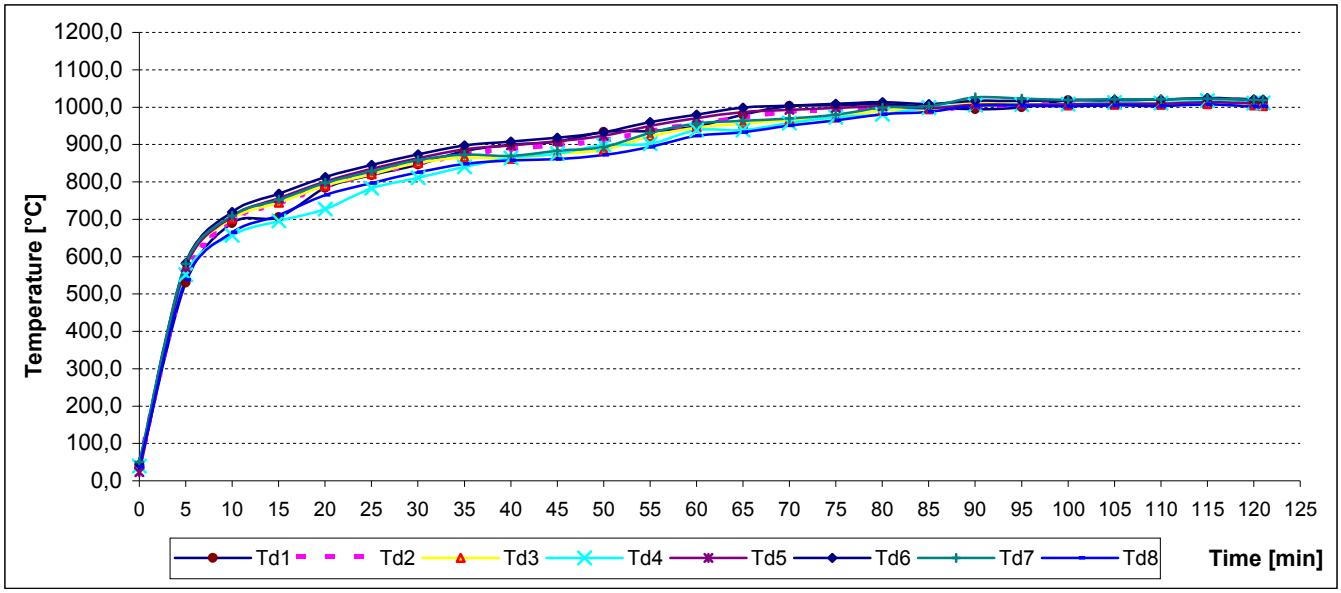
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	35,9	44,9	43,2	39,2	23,3	44,3	50,4	37,9	39,9	20,0	19,5	0,0	0,0
5	529,8	549,5	573,3	552,0	570,9	582,6	581,0	537,6	559,6	576,4	19,0	-13,8	9,7
10	689,3	699,2	701,4	656,6	707,6	719,3	709,1	664,6	693,4	678,4	18,5	-4,4	10,6
15	706,1	743,0	744,7	695,2	756,5	768,2	752,4	710,5	734,6	738,6	18,3	-2,6	11,2
20	783,4	789,2	789,7	727,3	800,8	812,5	797,4	765,0	783,2	781,4	17,5	-1,9	17,3
25	818,0	822,0	820,8	782,5	834,9	845,2	828,5	796,8	818,6	814,6	17,3	-1,4	15,9
30	846,6	849,0	850,7	810,8	863,3	873,6	858,4	826,1	847,3	841,8	17,4	-1,0	16,9
35	882,5	874,6	864,7	840,6	887,5	897,8	872,4	848,2	871,0	864,8	16,9	-0,7	16,1
40	899,3	888,4	861,9	864,2	898,0	908,3	869,6	857,3	880,9	884,7	16,7	-0,5	16,2
45	907,8	899,5	875,3	875,8	909,0	918,5	883,0	861,2	891,3	902,3	16,2	-0,6	15,6
50	933,5	911,7	885,9	898,6	923,2	932,7	893,6	872,3	906,4	918,1	16,1	-0,7	18,1
55	936,6	936,6	921,4	901,9	950,3	959,8	931,1	893,6	928,9	932,3	16,2	-0,7	18,9
60	948,5	955,7	945,8	938,7	970,3	979,8	955,5	923,0	952,2	945,3	15,7	-0,6	17,4
65	979,9	972,7	956,3	939,0	986,8	998,5	964,0	932,6	966,2	957,3	16,1	-0,5	16,6
70	1003,0	989,0	965,0	957,7	993,0	1004,0	969,7	950,8	979,0	968,4	16,3	-0,3	16,0
75	1005,0	994,8	971,9	973,1	998,0	1009,0	979,6	964,3	987,0	978,7	16,4	-0,2	19,0
80	1008,0	998,8	990,7	980,7	1002,0	1013,0	998,4	980,8	996,6	988,4	15,9	-0,2	18,9
85	999,9	994,6	994,3	998,3	997,0	1008,0	1002,0	987,8	997,7	997,4	16,1	-0,1	18,0
90	994,4	1002,0	1011,3	1005,3	1006,0	1017,0	1026,0	1004,0	1008,3	1005,9	16,8	-0,1	17,6
95	999,4	1006,0	1008,3	1007,2	1006,0	1017,0	1023,0	1004,0	1008,9	1014,0	17,5	-0,1	18,0
100	1018,0	1006,0	1004,3	1008,2	1007,0	1018,0	1019,0	1002,0	1010,3	1021,7	17,7	-0,1	18,3
105	1015,0	1009,0	1006,3	1012,0	1009,0	1020,0	1021,0	1005,0	1012,2	1029,0	17,7	-0,2	16,0
110	1009,0	1008,0	1006,3	1010,9	1009,0	1020,0	1021,0	1003,0	1010,9	1036,0	17,7	-0,3	16,4
115	1013,0	1012,0	1008,3	1017,8	1013,0	1024,0	1023,0	1007,0	1014,8	1042,6	17,6	-0,4	16,7
120	1015,0	1008,0	1004,3	1011,1	1010,0	1021,0	1019,0	1001,0	1011,2	1049,0	17,4	-0,5	17,2
121	1012,0	1008,0	1003,3	1011,5	1009,0	1020,0	1018,0	1002,0	1010,5	1050,2	17,7	-0,6	16,1

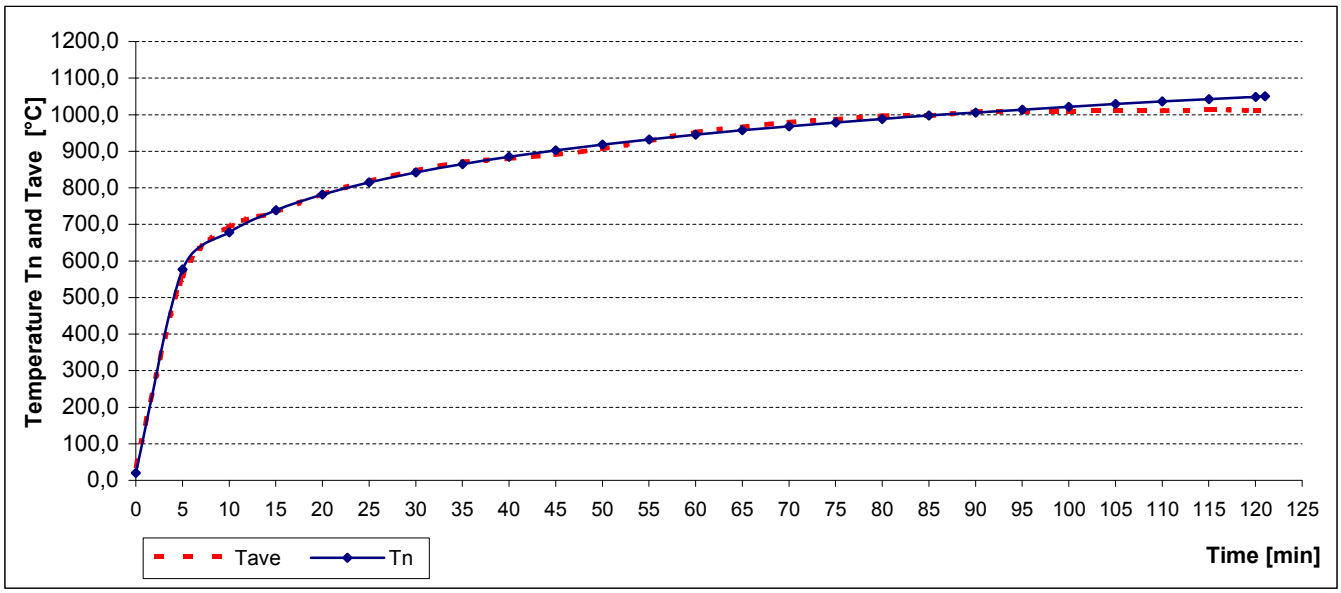
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

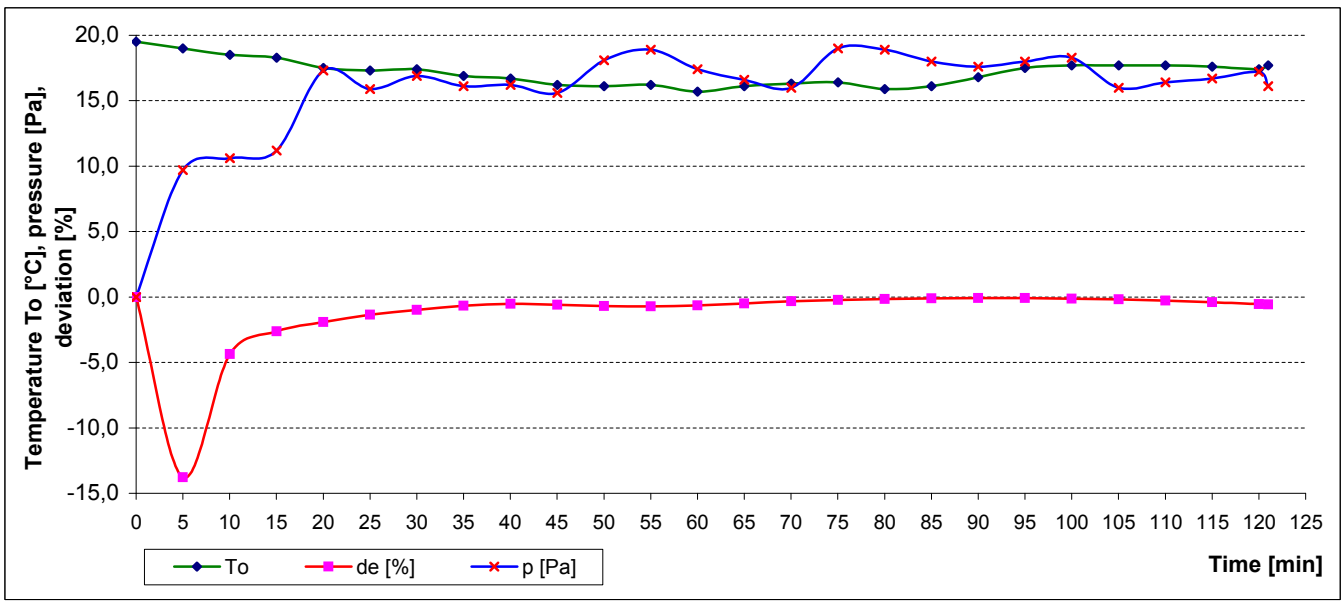
Layout of measuring points in the test furnace:



Measured values inside the test furnace / graph







Measured time of tested specimens from S1 to S10

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S1	1-L1	no failure / interruption
	2-L2	no failure / interruption
	3-L3	no failure / interruption
	4-PEN	no failure / interruption
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	no failure / interruption
	10-L2	no failure / interruption
	11-L3	no failure / interruption
	12-PEN	no failure / interruption
S4	13-L1	no failure / interruption
	14-L2	no failure / interruption
	15-L3	no failure / interruption
	16-PEN	no failure / interruption
S5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S6	21-L1	no failure / interruption
	22-L2	no failure / interruption
	23-L3	no failure / interruption
	24-PEN	no failure / interruption
S7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption
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 NHXH-J FE180 PH90/E90 4x50 RM
2	2 cables NHXCH FE180 PH90/E90 4x50/25 RM
3	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
4	cable NHXH-J FE180 PH90/E90 4x10 RE with Firebox WKE 54
5	cable NHXH-J FE180 PH90/E90 4x1,5 RE with Firebox WKE 54
6	2 cables NHXH-J FE180 PH90/E90 4x50 RM
7	2 cables NHXCH FE180 PH90/E90 4x50/25 RM
8	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
9	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM
10	2 cables (N)HXHX-J FE180 PH90/E90 4x50 RM

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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

Measured time of tested specimens from S11 to S20

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	111:30
	46-L2	x
	47-L3	x
	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	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
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)HXHX-J FE180 PH90/E90 4x1,5 RE
12	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE
13	2 cables (N)HXHX-J FE180 PH90/E90 4x50 RM
14	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM
15	2 cables (N)HXHX-J FE180 PH90/E90 4x1,5 RE
16	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE
17	2 cables NHXH-J FE180 PH90/E90 4x50 RM
18	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
19	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
20	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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

Measured time of tested specimens from S21 to S30

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	x
	86-L2	x
	87-L3	68:31
	88-PEN	x
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	no failure / interruption
	94-L2	no failure / interruption
	95-L3	no failure / interruption
	96-PEN	no failure / interruption
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	no failure / interruption
	106-L2	no failure / interruption
	107-L3	no failure / interruption
	108-PEN	no failure / interruption
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	x
	118-L2	79:23
	119-L3	x
	120-PEN	x

Specimens No.	Cables
21	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM
22	2 cables (N)HXH-J FE180 PH30/E30 4x1,5 RE
23	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM
24	2 cables (N)HXH-J FE180 PH30/E30 4x1,5 RE
25	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
26	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE
27	2 cables NHXH-J FE180 PH90/E90 4x50 RM
28	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
29	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM
30	cable (N)HXH-J FE180 PH90/E90 4x50 RM

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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

Measured time of tested specimens from S31 to S40

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	x
	122-L2	x
	123-L3	95:39
	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	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	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	no failure / interruption
	142-L2	no failure / interruption
	143-L3	no failure / interruption
	144-PEN	no failure / interruption
S37	145-L1	x
	146-L2	x
	147-L3	116:13
	148-PEN	x
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S39	153-L1	no failure / interruption
	154-L2	no failure / interruption
	155-L3	no failure / interruption
	156-PEN	no failure / interruption
S40	157-L1	85:07
	158-L2	x
	159-L3	x
	160-PEN	x

Specimens No.	Cables
31	cable (N)HXH-J FE180 PH90/E90 4x50 RM
32	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
33	2 cables (N)HXCH FE180 PH90/E90 4x1,5/1,5 RE
34, 35	2 cables NHXCH FE180 PH90/E90 4x50/25 RM
36	cable NHXH-J FE180 PH90/E90 4x50 RM
37	cable NHXH-J FE180 PH90/E90 4x50 RM
38	2 cables NHXH-J FE180 PH90/E90 4x1,5 RE
39	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE
40	cable NHXCH FE180 PH90/E90 4x10/10 RM with Firebox WKE 54

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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

Measured time of tested specimens from S41 to S51

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S41	161-L1	x
	162-L2	x
	163-L3	110:25
	164-PEN	x
S42	165-L1	x
	166-L2	42:59
	167-L3	x
	168-PEN	x
S43	169-L1	no failure / interruption
	170-L2	no failure / interruption
	171-L3	no failure / interruption
	172-PEN	no failure / interruption
S44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption
S45	177-L1	no failure / interruption
	178-L2	no failure / interruption
	179-L3	no failure / interruption
	180-PEN	no failure / interruption
S46	181-L1	no failure / interruption
	182-L2	no failure / interruption
	183-L3	no failure / interruption
	184-PEN	no failure / interruption
S47	185-L1	no failure / interruption
	186-L2	no failure / interruption
	187-L3	no failure / interruption
	188-PEN	no failure / interruption
S48	189-L1	no failure / interruption
	190-L2	no failure / interruption
	191-L3	no failure / interruption
	192-PEN	no failure / interruption
S49	193-L1	no failure / interruption
	194-L2	no failure / interruption
	195-L3	no failure / interruption
	196-PEN	no failure / interruption
S50	197-L1	no failure / interruption
	198-L2	no failure / interruption
	199-L3	no failure / interruption
	200-PEN	no failure / interruption
S51	201-L1	no failure / interruption
	202-L2	no failure / interruption
	203-L3	no failure / interruption
	204-PEN	no failure / interruption

Specimens No.	Cables
41	cable NHXCH FE180 PH90/E90 4x10/10 RM with Firebox WKE 54
42	cable (N)HXH-J FE180 PH90/E90 4x50 RM
43	cable (N)HXH-J FE180 PH90/E90 4x50 RM
44	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
45	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE
46	cable NHXH-J FE180 PH90/E90 4x10 RE with Firebox WKE 54
47	cable NHXH-J FE180 PH90/E90 4x1,5 RE with Firebox WKE 54
48, 49	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM
50	2 cables (N)HXH-J FE180 PH90/E90 4x1,5 RE
51	2 cables NHXCH FE180 PH90/E90 4x1,5 /1,5 RE

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

Measured time of tested specimens from S52 to S61

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	no failure / interruption
	210-PEN	no failure / interruption
S52B	211-L	no failure / interruption
	212-PEN	no failure / interruption
S53A	213-L	no failure / interruption
	214-PEN	no failure / interruption
S53B	215-L	no failure / interruption
	216-PEN	no failure / interruption
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S54B	219-L	no failure / interruption
	220-PEN	no failure / interruption
S55A	221-L	no failure / interruption
	222-PEN	no failure / interruption
S55B	223-L	no failure / interruption
	224-PEN	no failure / interruption
S56A	225-L	no failure / interruption
	226-PEN	no failure / interruption
S56B	227-L	no failure / interruption
	228-PEN	no failure / interruption
S57A	229-L	no failure / interruption
	230-PEN	no failure / interruption
S57B	231-L	no failure / interruption
	232-PEN	no failure / interruption
S58A	233-L	no failure / interruption
	234-PEN	no failure / interruption
S58B	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59A	237-L	no failure / interruption
	238-PEN	no failure / interruption
S59B	239-L	no failure / interruption
	240-PEN	no failure / interruption
S60A	241-L	45:24
	242-PEN	x
S60B	243-L	94:14
	244-PEN	x
S61A	245-L	42:16
	246-PEN	x
S61B	247-L	32:27
	248-PEN	x

Specimens No.	Cables
52	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
53	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
54	2 cables HLGs FE180 PH90/E30-E90 2x1,0 mm2
55	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
56	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm
57	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm
58	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm
59	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
60	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
61	2 cables HLGs FE180 PH90/E30-E90 2x1,0 mm2

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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 S68

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S62A	249-L	no failure / interruption
	250-PEN	no failure / interruption
S62B	251-L	no failure / interruption
	252-PEN	no failure / interruption
S63A	253-L	no failure / interruption
	254-PEN	no failure / interruption
S63B	255-L	no failure / interruption
	256-PEN	no failure / interruption
S64A	257-L	no failure / interruption
	258-PEN	no failure / interruption
S64B	259-L	no failure / interruption
	260-PEN	no failure / interruption
S65A	261-L	no failure / interruption
	262-PEN	no failure / interruption
S65B	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66A	265-L	no failure / interruption
	266-PEN	no failure / interruption
S66B	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	no failure / interruption
	270-PEN	no failure / interruption
S67B	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S68B	275-L	no failure / interruption
	276-PEN	no failure / interruption

Specimens No.	Cables
62	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
63	2 cables HLGs FE180 PH90/E30-E90 2x1,0 mm2
64	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
65	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm
66	2 cables HDGszo FE180 PH90/E30-E90 3x1,5 RE
67	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm
68	2 cables HTKSH FE180 PH90/E30-E90 1x2x0,8 mm

x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable

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 – right side

Photo taken before the test – left side

Photo taken before the test

PHOTOS

Photo taken after the test – right side

Photo taken after the test – left side

Photo taken after the test

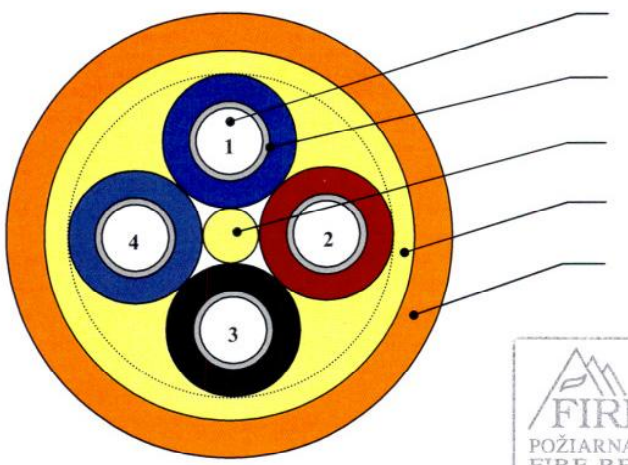
TECHNOKABEL®

CE RoHS

ISO 9001:2000

(N)HXH FE180 PH30/E30 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



conductor

insulation

filler

inner sheath

sheath

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01.04.2010

Podpis/Signature

Dokument č./Document No. FIRES-FR-121-10-ANNEX

Príloha č./Appendix No. 12

APPLICATIONS

(N)HXH FE180 PH30/E30 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

TECHNOKABEL®

CE RoHS ISO 9001:2000

(N)HXH FE180 PH30/E30 0,6/1 kV

CHARACTERISTICS

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

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E30	DIN 4102-12
PH30	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266 PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 16 RE	10	154	238
	1 x 25 RM	12	240	337
	1 x 35 RM	13	336	428
	1 x 50 RM	14	480	551
	1 x 70 RM	16	672	751
	1 x 95 RM	18	912	1049
	1 x 120 RM	19	1152	1299
	1 x 150 RM	21	1440	1617
	1 x 185 RM	23	1776	1950
	1 x 240 RM	27	2304	2597
	2 x 1,5 RE	14	29	252
	2 x 2,5 RE	14	48	299
	2 x 4,0 RE	15	77	356
	2 x 6,0 RE	16	115	423
	2 x 10 RE	18	192	556
	2 x 16 RE	20	307	741
	2 x 25 RM	24	480	879
	3 x 1,5 RE	14	43	299
	3 x 2,5 RE	15	72	337
	3 x 4,0 RE	16	115	413
	3 x 6,0 RE	17	173	499
	3 x 10 RE	19	288	656

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 16 RE	22	461	931
	3 x 25 RM	25	720	1321
				0
	4 x 1,5 RE	15	58	266
	4 x 2,5 RE	16	96	304
	4 x 4,0 RE	17	154	390
	4 x 6,0 RE	18	230	499
	4 x 10 RE	20	384	698
	4 x 16 RM	23	614	1083
	4 x 25 RM	27	960	1539
	4 x 35 RM	29	1344	1948
	4 x 50 RM	32	1920	2607
	5 x 1,5 RE	17	72	309
	5 x 2,5 RE	18	120	385
	5 x 4,0 RE	19	192	485
	5 x 6,0 RE	20	288	618
	5 x 10 RE	22	480	855
	5 x 16 RE	26	768	1292
	5 x 25 RM	30	1200	1900
	5 x 35 RM	32	1680	2423
	5 x 50 RM	37	2400	3381
	7 x 1,5 RE	18	101	356

RE - single wire round conductor;
RM - multiwire round conductor

Other cross-sections and conductor counts available on request.

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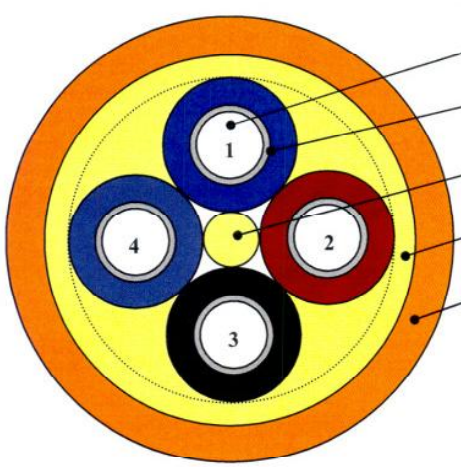
(N)HXH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



conductor
insulation
filler
inner sheath
sheath

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FIRE RESISTANCE

Dátum/Date 01. 04. 2010
Podpis/Signature

Dokument č./Document No. FIRES-FR-129-10-ANNEX

Príloha č./Appendix No. 14

APPLICATIONS

(N)HXH FE180 PH90/E90 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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(N)HXH FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 16 RE	10	154	250
	1 x 25 RM	12	240	355
	1 x 35 RM	13	336	450
	1 x 50 RM	14	480	580
	1 x 70 RM	16	672	790
	1 x 95 RM	18	912	1070
	1 x 120 RM	19	1152	1325
	1 x 150 RM	21	1440	1650
	1 x 185 RM	23	1776	1990
	1 x 240 RM	27	2304	2650
	2 x 1,5 RE	14	29	265
	2 x 2,5 RE	14	48	315
	2 x 4,0 RE	15	77	375
	2 x 6,0 RE	16	115	445
	2 x 10 RE	18	192	585
	2 x 16 RE	20	307	780
	2 x 25 RM	24	480	925
	3 x 1,5 RE	14	43	315
	3 x 2,5 RE	15	72	355
	3 x 4,0 RE	16	115	435
	3 x 6,0 RE	17	173	525
	3 x 10 RE	19	288	690

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 16 RE	22	461	980
	3 x 25 RM	25	720	1390
	4 x 1,5 RE	14	58	270
	4 x 2,5 RE	16	96	320
	4 x 4,0 RE	17	154	410
	4 x 6,0 RE	18	230	525
	4 x 10 RE	20	384	735
	4 x 16 RM	23	614	1140
	4 x 25 RM	27	960	1620
	4 x 35 RM	29	1344	2050
	4 x 50 RM	32	1920	2660
	5 x 1,5 RE	17	72	325
	5 x 2,5 RE	18	120	405
	5 x 4,0 RE	19	192	510
	5 x 6,0 RE	20	288	650
	5 x 10 RE	22	480	900
	5 x 16 RE	26	768	1360
	5 x 25 RM	30	1200	2000
	5 x 35 RM	32	1680	2550
	5 x 50 RM	37	2400	3450
	7 x 1,5 RE	18	101	375

RE - single wire round conductor;
RM - multiwire round conductor
Other cross-sections and conductor counts available on request.

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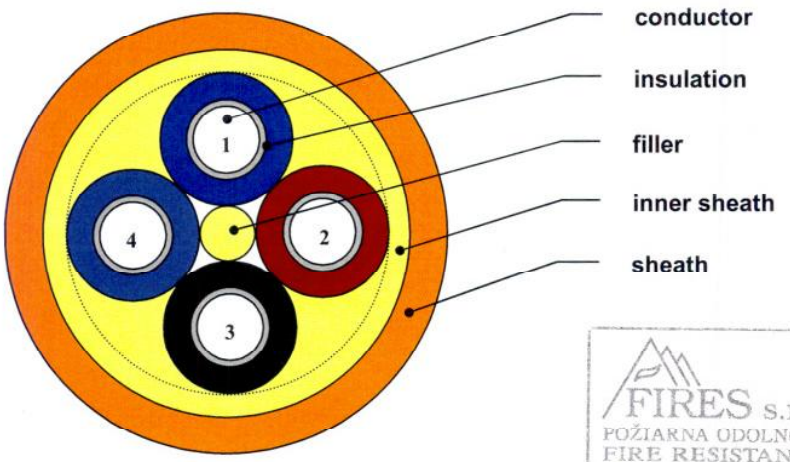
(N)HXHX-J FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



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FIRE RESISTANCE

Dátum/Date 01.09.2010

Podpis/Signature

Dokument č./Document No. FIRES-FR-129-10-ANNEX

Príloha č./Appendix No. 16

APPLICATIONS

(N)HXHX-J FE180 PH90/E90 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

conductor	–	bare copper, solid or stranded, according to PN-EN 60228, EN 60228,
insulation	–	double insulation ,cross-linked silicone rubber - colours in accordance with PN-HD 308,
filler	–	filler made of halogen free compound,
inner sheath	–	inner sheath made of halogen free compound,
sheath	–	orange, halogen free cross-linked compound according to HD 604 S1,

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(N)HXHX-J FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 16 RE	10	154	250
	1 x 25 RM	12	240	355
	1 x 35 RM	13	336	450
	1 x 50 RM	14	480	580
	1 x 70 RM	16	672	790
	1 x 95 RM	18	912	1070
	1 x 120 RM	19	1152	1325
	1 x 150 RM	21	1440	1650
	1 x 185 RM	23	1776	1990
	1 x 240 RM	27	2304	2650
	2 x 1,5 RE	14	29	265
	2 x 2,5 RE	14	48	315
	2 x 4,0 RE	15	77	375
	2 x 6,0 RE	16	115	445
	2 x 10 RE	18	192	585
	2 x 16 RE	20	307	780
	2 x 25 RM	24	480	925
	3 x 1,5 RE	14	43	315
	3 x 2,5 RE	15	72	355
	3 x 4,0 RE	16	115	435
	3 x 6,0 RE	17	173	525
	3 x 10 RE	19	288	690

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 16 RE	22	461	980
	3 x 25 RM	25	720	1390
	4 x 1,5 RE	14	58	270
	4 x 2,5 RE	16	96	320
	4 x 4,0 RE	17	154	410
	4 x 6,0 RE	18	230	525
	4 x 10 RE	20	384	735
	4 x 16 RM	23	614	1140
	4 x 25 RM	27	960	1620
	4 x 35 RM	29	1344	2050
	4 x 50 RM	33	1920	2760
	5 x 1,5 RE	17	72	325
	5 x 2,5 RE	18	120	405
	5 x 4,0 RE	19	192	510
	5 x 6,0 RE	20	288	650
	5 x 10 RE	22	480	900
	5 x 16 RE	26	768	1360
	5 x 25 RM	30	1200	2000
	5 x 35 RM	32	1680	2550
	5 x 50 RM	37	2400	3450
	7 x 1,5 RE	18	101	375

RE - single wire round conductor;
RM - multiwire round conductor
Other cross-sections and conductor counts available on request.

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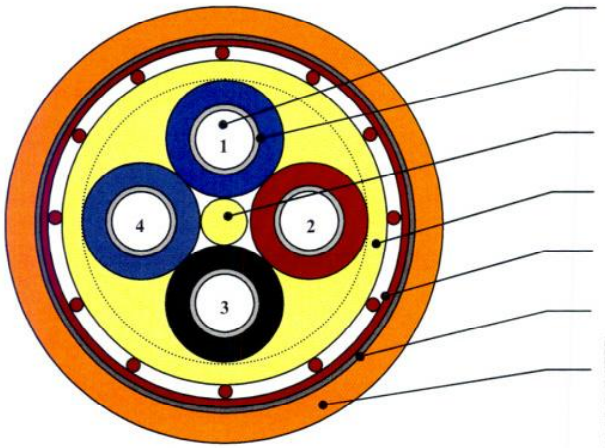
(N)HXCH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



conductor

insulation

filler

inner sheath

concentric conductor

separator

sheath

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FIRE RESISTANCE

Dátum/Date 01. 04. 2010

Podpis/Signature

Dokument č./Document No. FIRES-FR-KR-10-PUVE

Príloha č./Appendix No. 18

APPLICATIONS

(N)HXCH FE180 PH90/E90 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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CE RoHS ISO 9001:2000

(N)HXCH FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity*	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266 PN-HD 604 S1

*Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 1,5RE/1,5	16	66	280
	3 x 2,5 RE/2,5	17	104	370
	3 x 4,0 RE/4,0	18	161	478
	3 x 6,0 RE/6,0	20	240	540
	3 x 10 RE/10	23	408	840
	3 x 16 RE/16	26	643	1220
	3 x 25 RM/16	30	902	1550
	3 x 35 RM/16	33	1190	1960
	3 x 50 RM/25	37	1723	2640
	4 x 1,5RE/1,5	15	81	330
	4 x 2,5 RE/2,5	19	128	500
	4 x 4,0 RE/4,0	20	200	600

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	4 x 6,0 RE/6,0	21	297	770
	4 x 10 RE/10	22	504	960
	4 x 16 RE/16	26	796	1340
	4 x 25 RM/16	32	1146	2100
	4 x 35 RE/16	34	1528	2610
	4 x 50 RM/25	35	2205	2995
	7 x 1,5RE/2,5	20	133	480
	7 x 2,5 RE/2,5	21	200	590
	12 x 1,5RE/2,5	25	205	735
	12 x 2,5 RE/4,0	27	334	950

RE - single wire round conductor;
RM - multiwire round conductor

Other cross-sections and conductor counts available on request.

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FIRE RESISTANCE

Dátum/Date 01. 06. 2020
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Dokument č./Document No. FIRES-FR-127-10-ANNE

Príloha č./Appendix No. 19

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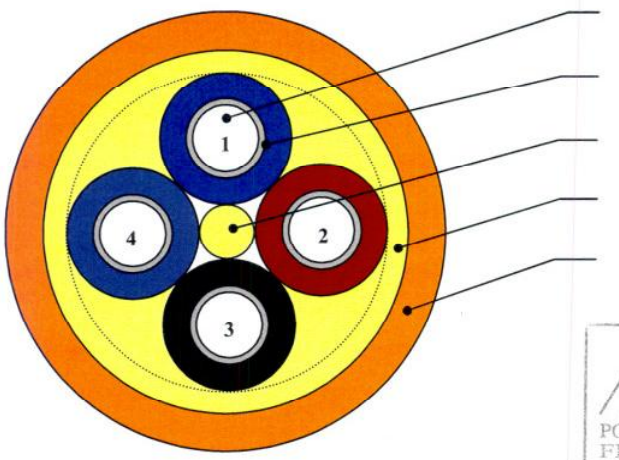
NHXH FE180 PH90/E90 0,6/1 kV, NHXH-J FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



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FIRE RESISTANCE

Dátum/Date 01.08.2010

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Dokument č./Document No. FIRES-FR-RK-10-AVKE

Príloha č./Appendix No. 20

APPLICATIONS

NHXH FE180 PH90/E90 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01.01.2010

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Document No. FIRES-FR-121-10-AUVE

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ISO 9001:2000

NHXH FE180 PH90/E90 0,6/1 kV, NHXH-J FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 μS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	15 x cable diameter
Cable combustibility	flame retardant
Circuit integrity*	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24 PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266, PN-HD 604 S1

*Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 6 RE	8,5	58	122
	1 x 10 RE	9,3	96	167
	1 x 16 RE	10,2	154	230
	1 x 25 RM	12,2	240	340
	1 x 35 RM	13,2	336	440
	1 x 50 RM	14,5	480	565
	1 x 70 RM	16,4	672	775
	1 x 95 RM	18,1	912	1030
	1 x 120 RM	19,8	1152	1270
	1 x 150 RM	21,5	1440	1570
	1 x 185 RM	23,6	1776	1960
	1 x 240 RM	26,1	2304	2520
	1 x 300 RM	28,7	2880	3100
	1 x 400 RM	32	3840	4170
	2 x 1,5 RE	12	28,8	197
	2 x 2,5 RE	12,8	48	235
	2 x 4 RE	13,7	77	285
	2 x 6 RE	14,7	115	350
	2 x 10 RE	16,3	192	465
	2 x 16 RE	18,3	307	640
	2 x 25 RM	22,5	480	975
	3 x 1,5 RE	12,6	43,2	225
	3 x 2,5 RE	13,4	72	270
	3 x 4 RE	14,4	115	335
	3 x 6 RE	15,5	173	415
	3 x 10 RE	17,2	288	570
	3 x 16 RM	19,3	461	800
	3 x 25 RM	23,8	720	1230
	3 x 35 RM	26,4	1008	1600
	3 x 50 RM	29,4	1440	2070
	3 x 70 RM	34,3	2016	2900
	3 x 95 RM	38,2	2736	3850
	3 x120 RM	42,0	3456	4750

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	4 x 1,5 RE	13,5	58	260
	4 x 2,5 RE	14,4	96	315
	4 x 4 RE	15,5	154	395
	4 x 6 RE	16,7	230	495
	4 x 10 RE	18,8	384	700
	4 x 16 RM	21,2	614	990
	4 x 25 RM	26,5	960	1540
	4 x 35 RM	29,1	1344	1990
	4 x 50 RM	32,8	1920	2620
	4 x 70 RM	37,8	2688	3650
	4 x 95 RM	42,1	3648	4800
	5 x 1,5 RE	14,5	72	295
	5 x 2,5 RE	15,5	120	360
	5 x 4 RE	16,8	192	460
	5 x 6 RE	18,3	288	590
	5 x 10 RE	20,7	480	835
	5 x 16 RM	23,1	768	1180
	5 x 25 RM	29,1	1200	1840
	5 x 35 RM	32,4	1680	2430
	5 x 50 RM	36,1	2400	3200
	5 x 70 RM	41,7	3360	4400
	5 x 95 RM	47,7	4560	5950
	7 x 1,5 RE	15,6	101	350
	7 x 2,5 RE	16,7	168	440
	7 x 4,0 RE	18,3	269	580
	12 x 1,5 RE	19,8	173	535
	12 x 2,5 RE	21,6	288	690
	19 x 1,5 RE	23,0	274	740
	19 x 2,5 RE	24,9	456	960
	24 x 1,5 RE	26,9	346	945
	24 x 2,5 RE	29,4	576	1230
	30 x 1,5 RE	28,6	432	1110
	30 x 2,5 RE	31,2	720	1460

RE - single wire round conductor;
RM - multiwire round conductor
Other cross-sections and conductor counts available on request.

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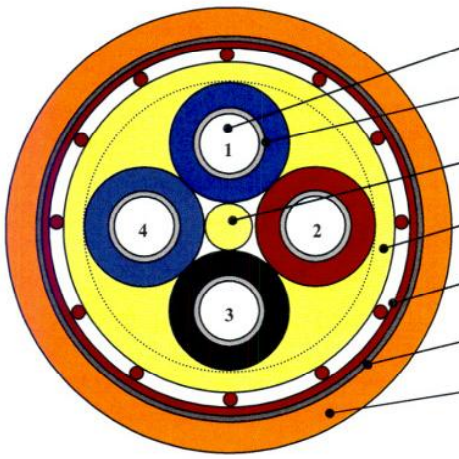
NHXCH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



conductor
insulation
filler
inner sheath
concentric conductor
separator
sheath

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE
Dátum/Date 01.02.2010
Podpis/Signature
Dokument č. Document No. FIRES-FR-121-10-ANNE
Príloha č./Appendix No. 22

APPLICATIONS

NHXCH FE180 PH90/E90 0,6/1 kV fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej) at Józefów – **Certificate of Conformity No. 2412/2007**.

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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NHXCH FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

Operating voltage	0.6/1 kV
Voltage test	4.0 kV rms
Insulation resistivity at 90°C, minimum	1 x 10^{11} Ω·cm
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from -15 to +90°C
during installation	from -5 to +70°C
Minimum bending radius	12 x cable diameter
Cable combustibility	flame retardant
Circuit integrity *	
E90	DIN 4102-12
PH90	PN-EN 50200 or PN-EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Combustibility tests	PN-EN 50266-2-4, IEC 60332-3-24, PN-EN 50200 and PN-EN 50362
Reference standards	AT-0603-0064/2006, WT-TK-44 DIN VDE 0266 PN-HD 604 S1

* Circuit integrity is dependent on installation method.

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

Numer wyrobu	Liczba żył x przekrój żył	Średnica zewnętrzna (około)	Indeks miedziowy	Masa kabla (około)
	mm²	mm	kg/km	kg/km
	2 x 1,5 RE/1,5	13,7	52	255
	2 x 2,5 RE/2,5	14,7	80	300
	2 x 4 RE/ 4	16,0	123	375
	2 x 6 RE/ 6	17,0	182	440
	2 x 10 RE/ 10	19,2	312	620
	2 x 16 RE/ 16	21,2	489	820
	2 x 25 RM/ 16	25,0	661	1160
	2 x 35 RM/ 16	27,0	853	1430
	2 x 50 RM/ 25	30,0	1243	1840
	2 x 70 RM/ 35	35,1	1737	2730
	2 x 95 RM/ 50	39,5	2386	3800
	2 x 120 RM/ 70	43,1	3090	4700
	3 x 1,5 RE/ 1,5	14,3	66	280
	3 x 2,5 RE/ 2,5	15,3	104	340
	3 x 4 RE/4	16,7	161	425
	3 x 6 RE/ 6	17,8	240	515
	3 x 10 RE/ 10	20,1	408	730
	3 x 16 RE/ 16	22,2	643	985
	3 x 25 RM/ 16	26,4	902	1420
	3 x 35 RM /16	28,7	1190	1790
	3 x 50 RM/ 25	31,9	1723	2310
	3 x 70 RM/ 35	37,3	2410	3300
	3 x 95 RM/ 50	39,5	3296	4550
	3 x 120 RM/ 70	45,8	4236	5450

Numer wyrobu	Liczba żył x przekrój żył	Średnica zewnętrzna (około)	Indeks miedziowy	Masa kabla (około)
	mm²	mm	kg/km	kg/km
	4 x 1,5 RE/ 1,5	15,2	81	320
	4 x 2,5 RE/ 2,5	16,4	128	390
	4 x 4 RE/ 4	17,8	200	495
	4 x 6 RE/ 6	19,0	297	625
	4 x 10 RE/ 10	21,6	504	890
	4 x 16 RE/ 16	23,9	796	1190
	4 x 25 RM/ 16	28,8	1142	1740
	4 x 35 RM/ 16	31,4	1526	2220
	4 x 50 RM/ 25	35,3	2203	2920
	4 x 70 RM/ 35	40,8	3082	4100
	4 x 95 RM/ 50	45,9	4208	5650
	4 x 120 RM/ 70	50,8	5388	6900
	7 x 1,5 RE/ 2,5	17,3	133	420
	7 x 2,5 RE/ 2,5	18,6	200	520
	12 x 1,5 RE/ 2,5	21,4	205	640
	12 x 2,5 RE/ 4	23,4	334	800
	24 x 1,5 RE/ 6	28,3	413	1080
	24 x 2,5 RE/ 10	30,9	696	1410
	30 x 1,5 RE/ 6	29,7	499	1250
	30 x 2,5 RE/ 10	32,7	840	1650

RE - single wire round conductor;
RM - multiwire round conductor
Other cross-sections and conductor counts available on request.

FIRES s.r.o.
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FIRE RESISTANCE

Dátum/Date 01.04.2010
Podpis/Signature

Dokument č./Document No. FIRES-FR-121-10-AJNE

Príloha č./Appendix No. 23

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

PRZEWODY ELEKTROENERGETYCZNE OGNIOODPORNE, BEZHALOGENOWE

ZASTOSOWANIE

Przewody elektroenergetyczne ognioodporne i bezhalogenowe typu **HDGs(żo) FE180 PH90/E30-E90 300/500 V, HLGs(żo) FE180 PH90/E30-E90 300/500 V** i ekranowane typu **HDGsekw(żo) FE180 PH90/E30-E90 300/500 V, HLGsekw(żo) FE180 PH90/E30-E90 300/500 V**, przeznaczone są do zasilania instalacji w obiektach o podwyższonych wymaganiach przeciwpożarowych. tj. zapewnienie dopływu energii elektrycznej do urządzeń, których działanie jest niezbędne podczas pożaru oraz jego gaszenia. Kable nie rozprzestrzeniają płomienia, emisja dymu jest bardzo niska, a emitowane gazy są nietoksyczne i niekorozyjne. Przewody zaleca się stosować w instalacjach oświetlenia awaryjnego, systemach oddymiana oraz mogą być stosowane w systemach alarmowych, sygnalizacyjnych, kontrolnych, DSO i innych urządzeniach przeciwpożarowych, których działanie przewidziane jest w warunkach pożaru.

Posiadają one **Certyfikat Zgodności nr 2698/2009** wystawiony przez Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej w Józefowie.

W przypadku kabli ekranowanych **(ekw)** wspólny ekran statyczny chroni kabel przed zakłóceniami indukowanymi przez zewnętrzne pola elektryczne.

Kable bezhalogenowe używane są tam, gdzie potrzebne jest większe bezpieczeństwo ludzi i kosztownych urządzeń elektronicznych na wypadek pożaru.

W przypadku pożaru, **kable te zapewniają podtrzymanie funkcji kabla** (tj. zapewnienie transmisji danych oraz dopływu energii elektrycznej do urządzeń, które muszą funkcjonować w warunkach pożaru oraz podczas jego gaszenia np. instalacje oświetlenia awaryjnego). Kable nie rozprzestrzeniają płomienia, emisja dymu jest bardzo niska, a emitowane gazy są nietoksyczne i niekorozyjne.

BUDOWA

- żyły jednodrutowe **(D)** lub wielodrutowe **(L)** z miękkich drutów miedzianych gołych lub ocynowanych, klasy 1,2 lub 5 wg PN-EN 60228,
- izolacja żył wykonana ze specjalnej usieciowanej gumy silikonowej,
- kolory izolacji żył wg normy PN-HD 308 S2,

Liczba żył	Barwy izolacji żył w przewodzie	
	z żyłą ochronną (żo)	bez żyły ochronnej
2	-	niebieska i brązowa
3	zielono-zółta, niebieska, brązowy	brązowa, czarna i szara
4	zielono-zółta, niebieska, brązowa, czarna	czarna, niebieska i brązowa
5	zielono-zółta, niebieska, brązowa, czarna, szara	czarna, niebieska, brązowa, czarna i czarna
powyżej 5 żył	żyły numerowane	

- żyły izolowane skręcone razem w warstwy o przeciwnych kierunkach skrętu,
- ośrodek kabla owinięty taśmą poliestrową dla przewodów HDGsekw i HLGsekw,
- ekran statyczny dla przewodów HDGsekw i HLGsekw z laminowanej tworzywem folii aluminiowej, z ocynowaną żyłą uziemiającą,
- powłoka kabla wykonana z tworzywa bezhalogenowego, w kolorze czerwonym.

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

DANE TECHNICZNE

Średnica żyły (klasa 1 lub 2), około	mm	1,0	1,1	1,4	1,8	2,3	2,8
Przekrój żyły (klasa 5)	mm^2	0,75	1	1,5	2,5	4	6
Maksymalna rezystancja żył w temp. 20℃	Ω/km	26,0	19,5	13,3	7,98	4,95	3,30
Pojemność pomiędzy żyłami przy 1 kHz, – maksymalna	nF/km	120	120	120	120	120	120
– średnia		70	70	80	80	100	100

Napięcie pracy U_o/U	300/500 V
Próba napięciowa	2 kV sk
Minimalna rezystancja izolacji w temp. 20℃	100 M Ω·km
Indukcyjność, około	0,7 mH/km
Maksymalna dopuszczalna temperatura przy żyle	
w warunkach pracy	+ 85℃
przy zwarciu (max.5 s)	+ 250℃
Zakres temperatur pracy	
podczas pracy	od - 25 do + 85℃
podczas układania	od -10 do + 50℃
Minimalny promień gięcia	
przewody HDGs(ekw)	10 x średnica przewodu
przewody HLGs(ekw)	6 x średnica przewodu

Korozyjność wydziel. gazów	bardzo mała, bezhalogenowy PN-EN 50267-2-3, IEC 60754-2
pH, około	6,8
konduktywność, około	0,4 µS/mm
Gęstość dymu	niska gęstość dymu PN-EN 50268-2-3, IEC 61034-2
przepuszczalność światła, min.	94 %
Palność kabla	nie rozprzestrzeniający płomienia, o zmniejszonej palności PN-EN 60332-1-2, IEC 60332-1, PN-EN 50266-2-2, IEC 60332-3-22 (cat.A)
Próby palności	
Podtrzymanie funkcji:	
E30-E90	DIN 4102-12
PH90	PN-EN 50200 lub EN 50362
Trwałość izolacji FE180	IEC 60331-21; IEC 60331-11
Wykonanie wg normy	AT-603-0248/2009 i WT-TK-46

Instalacja kabla - **powinna być przeprowadzona na certyfikowanym systemie zamocowań kabli. Zalecamy stosowanie zespołu kablowego (kable wraz z system zamocowań) przebadanego wg norm DIN 4102 część 12 lub PN-EN 50200 (PN-EN 50362). Obecnie posiadamy badania przeprowadzone na systemach firmy BAKS i Legrand (Cablofil).**

CE = przewód spełnia wymagania dyrektywy niskonapięciowej 2006/95/WE

Symbol wyrobu	Liczba x średnica żył	Średnica zewnętrzna (około)	Indeks miedziowy	Masa kabla (około)
	mm	mm	kg/km	kg/km
HDGs	2 x 0,75	6,4	14,4	50
HDGs	2 x 1	6,6	19,2	55
HDGs	2 x 1,5	7,5	28,8	75
HDGs	2 x 2,5	8,9	48	105
HDGs	2 x 4	9,8	77	140
HDGs	2 x 6	11,6	115	200
HDGs	3 x 0,75	7,1	21,6	68
HDGs	3 x 1	7,2	28,8	70
HDGs	3 x 1,5	8,2	43,2	95
HDGs	3 x 2,5	9,7	72	140
HDGs	3 x 4	10,9	115	200
HDGs	3 x 6	12,8	173	280
HDGs	4 x 0,75	6,4	28,8	60
HDGs	4 x 1	7,6	38,4	90

Symbol wyrobu	Liczba x średnica żył	Średnica zewnętrzna (około)	Indeks miedziowy	Masa kabla (około)
	mm	mm	kg/km	kg/km
HDGs	4 x 1,5	8,9	58	125
HDGs	4 x 2,5	10,4	96	185
HDGs	4 x 4	11,5	154	250
HDGs	4 x 6	13,7	230	360
HDGs	5 x 0,75	6,5	36	68
HDGs	5 x 1	8,5	48	110
HDGs	5 x 1,5	9,9	72	155
HDGs	5 x 2,5	11,4	120	220
HDGs	5 x 4	12,6	192	305
HDGs	5 x 6	15,1	288	450
HLGs	2 x 1	6,8	19,2	55
HLGsekw	2 x 1	7,0	19,2	65
HDGsekw	2 x 1	6,8	19,2	55

Na zamówienie klienta wykonujemy przewody o innych średnicach i innej liczbie żył.

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Dátum/Date 01.04.2010

Podpis/Signature

Dokument č. Document No. FIRES-FR-124-10-RNLE

Príloha č./Appendix No. 25

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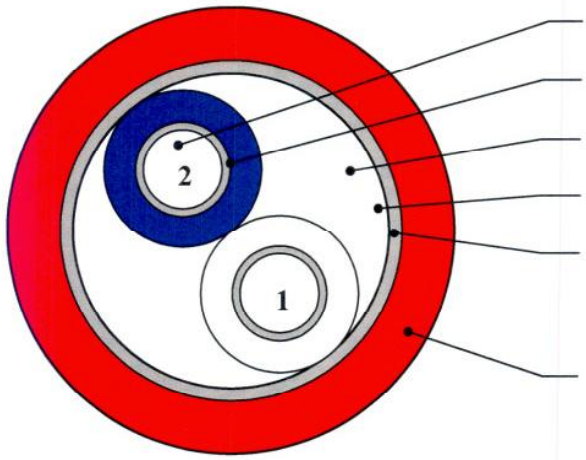
HTKSH FE180 PH90/E30-E90

FIRE RESISTANT HALOGEN FREE CABLES



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Dátum/Date 01.04.2020

Podpis/Signature

Dokument č. Document No. FIRES-FR-RT-10-ANNE

Príloha č./Appendix No. 26

APPLICATIONS

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

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

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

The cables are suitable for indoor installations.

CONSTRUCTION

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

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HTKSH FE180 PH90/E30-E90

CHARACTERISTICS

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

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

Operating voltage: 240 V
Voltage test: 1.5 kV rms
Insulation resistance, minimum: 100 MΩ·km
Inductance, approximate: 0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2
- pH, approximate: 6.8
- conductivity, approximate: 0.4 µS/mm

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

Operating temperature range
- during operation: from - 30 to + 80°C
- during installation: from - 5 to + 70°C

Minimum bending radius: 10 x cable diameter
Cable combustibility: flame retardant
Combustibility tests: PN-EN 60332-1-2
Circuit integrity*
- E30-E90: DIN 4102-12
- PH90: PN-EN 50200 or EN 50362

Insulation integrity FE180: IEC 60331-21; IEC 60331-11
Reference standards: WT-TK-43, PN-92/T-90320, PN-92/T-90321

*Circuit integrity is dependent on installation method.

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

Cable type	Number of pairs (x 2) x conductor diameter	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm	mm	kg/km	kg/km
HTKSH FE180 PH90/E30-E90	1 x 2 x 0.8	6.5	10	61

Other diameters and conductor counts available on request.

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 01.04.2010 Podpis/Signature
Dokument č. Document No. FIRES-FR-121-10-AUJE	
Príloha č./Appendix No. 21	

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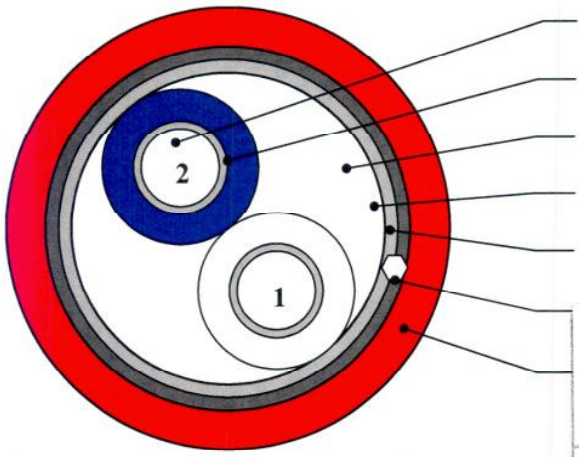
HTKSHekw FE180 PH90/E30-E90

FIRE RESISTANT HALOGEN FREE CABLES



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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01.09.2010

Podpis/Signature

Dokument č./Document No. FIRES-FR-127-10-AKKE

Príloha č./Appendix No. 28

APPLICATIONS

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

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

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

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

The cables are suitable for indoor installations.

CONSTRUCTION

conductor	–	bare copper, solid,
insulation	–	mica tape and halogen free compound insulation - colours in accordance with PN-92/T-90321 standard,
pair	–	insulated conductors twisted into pairs,
cable core	–	pairs laid-up into a cable core,
separator	–	polyester tape,
shielding	–	overall electrostatic shield incorporating a plastic laminated metal foil and a tinned copper drain wire Ø 0.8 mm,
sheath	–	red, cable sheath made of halogen free compound according to EN 50290-2-27 and VDE 0250-214 – HM2, (oxygen index bigger than 35%).

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TECHNOKABEL®

ISO 9001:2000

HTKSHekw FE180 PH90/E30-E90

CHARACTERISTICS

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

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

Operating voltage	240 V
Voltage test	1.5 kV rms
Insulation resistance, minimum	100 MΩ·km
Inductance, approximate	0.7 mH/km
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2	
pH, approximate	6.8
conductivity, approximate	0.4 µS/mm
Smoke density per PN-EN 50268-2-3, IEC 61034-2	
light transmittance, minimum	94%

Operating temperature range	
during operation	from - 30 to + 80°C
during installation	from - 5 to + 70°C
Minimum bending radius	10 x cable diameter
Cable combustibility	flame retardant
Combustibility tests	PN-EN 60332-1-2
Circuit integrity *	
E30-E90	DIN 4102-12
PH90	PN-EN 50200 or EN 50362
Insulation integrity FE180	IEC 60331-21; IEC 60331-11
Reference standards	WT-TK-43 PN-92/T-90320 PN-92/T-90321

*Circuit integrity is dependent on installation method.

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

Cable type	Number of pairs (x 2) x conductor diameter	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm	mm	kg/km	kg/km
HTKSHekw FE180 PH90/E30-E90	1 x 2 x 0.8	7.4	15	66

Other diameters and conductor counts available on request.

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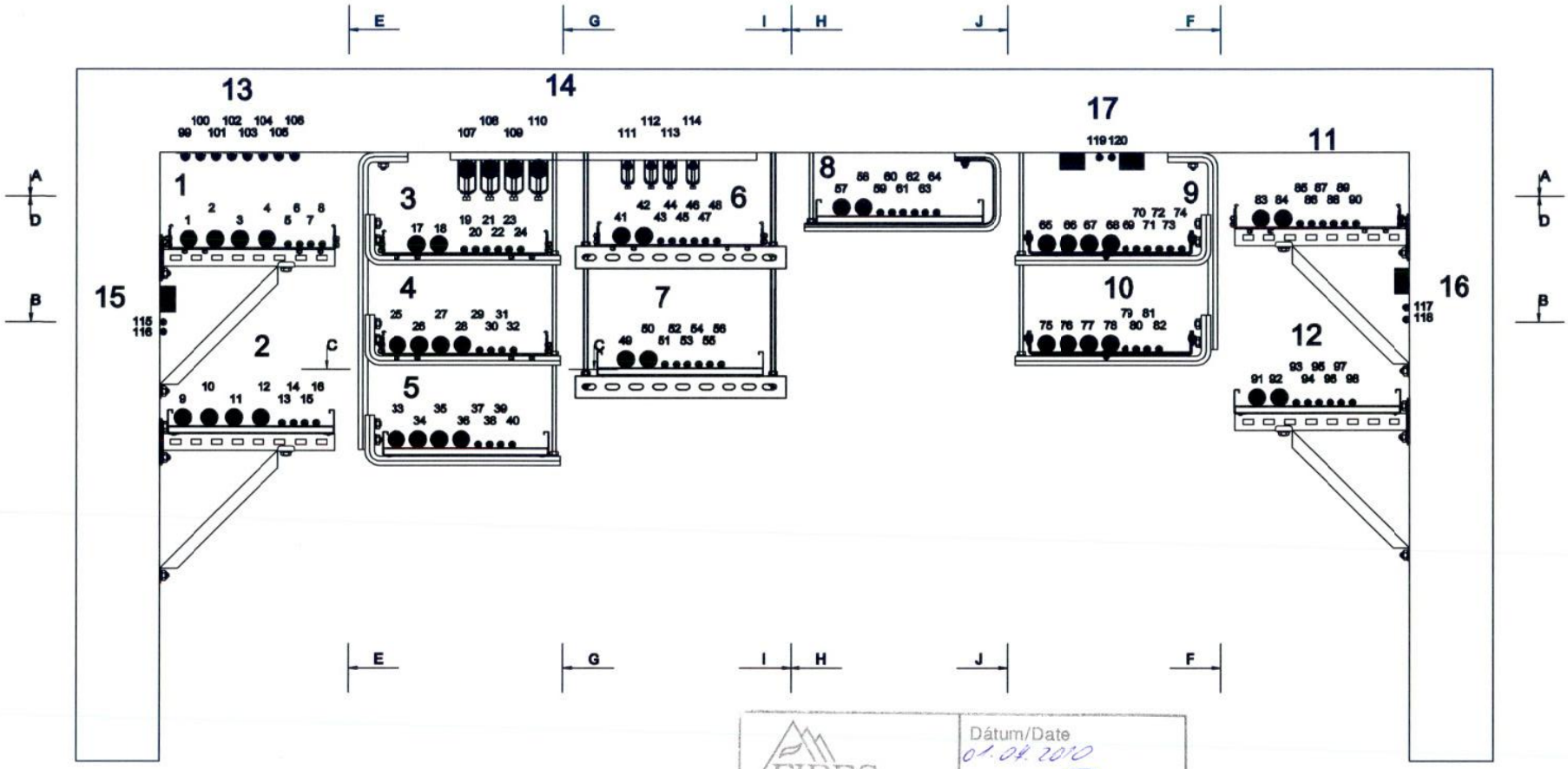

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Dokument č./Document No. FIRES-FR-124-10-ANE

Príloha č./Appendix No. 30

Badanie zespołu kablowego BAKS - SPELSBERG - TECHNOKABEL
Badanie w FIRES Słowacja Data 01.07.2010

Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
1	6		NHXH-J FE180 PH90/E90 4x50 RM	1	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WPTO400 + podpórka wysięgnika PWO 400, Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80
2			NHXH-J FE180 PH90/E90 4x50 RM		
3	7		NHXCH FE180 PH90/E90 4x50/25 RM		
4			NHXCH FE180 PH90/E90 4x50/25 RM		
5	8		NHXH-J FE180 PH90/E90 4x1.5 RE		
6			NHXH-J FE180 PH90/E90 4x1.5 RE		
7	53A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
8	53B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
9	1		NHXH-J FE180 PH90/E90 4x50 RM	2	Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WPTO400 + podpórka wysięgnika PWO 400, Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80
10			NHXH-J FE180 PH90/E90 4x50 RM		
11	2		NHXCH FE180/ E90 4x50/25 RM		
12			NHXCH FE180/ E90 4x50/25 RM		
13	3		NHXH-J FE180 PH90/E90 4x1.5 RE		
14			NHXH-J FE180 PH90/E90 4x1.5 RE		
15	52A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
16	52B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
17	17		NHXH-J FE180 PH90/E90 4x50 RM	3	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 600, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M10x 40
18			NHXH-J FE180 PH90/E90 4x50 RM		
19	18		NHXH-J FE180 PH90/E90 4x1.5 RE		
20			NHXH-J FE180 PH90/E90 4x1.5 RE		
21	58B		HTKSH FE180 PH90/E90 1x2x0,8		
22	58A		HTKSH FE180 PH90/E90 1x2x0,8		
23	59B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
24	59A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
25	13		(N)HXHX-J FE180 PH90/E90 4x50 RM	4	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 600, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M10x 40
26			(N)HXHX-J FE180 PH90/E90 4x50 RM		
27	14		(N)HXCH FE180 PH90/E90 4x50/25 RM		
28			(N)HXCH FE180 PH90/E90 4x50/25 RM		
29	15		(N)HXHX-J FE180 PH90/E90 4x1.5 RE		
30			(N)HXHX-J FE180 PH90/E90 4x1.5 RE		
31	16		(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
32			(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
33	9		(N)HXCH FE180 PH90/E90 4x50/25 RM	5	Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 600, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M10x 40
34			(N)HXCH FE180 PH90/E90 4x50/25 RM		
35	10		(N)HXHX-J FE180 PH90/E90 4x50 RM		
36			(N)HXHX-J FE180 PH90/E90 4x50 RM		
37	11		(N)HXHX-J FE180 PH90/E90 4x1.5 RE		
38			(N)HXHX-J FE180 PH90/E90 4x1.5 RE		
39	12		(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
40			(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		

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Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
41	23		(N)HXH-J FE180 PH30/E30 4x50 RM	6	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, do betonu za pomocą tulei stalowej TRSO M10x 40
42			(N)HXH-J FE180 PH30/E30 4x50 RM		
43	24		(N)HXH-J FE180 PH30/E30 4x1.5 RE		
44			(N)HXH-J FE180 PH30/E30 4x1.5 RE		
45	62B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
46	62A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
47	63B		HLGs FE180 PH90/E30-E90 2x1 mm^2		
48	63A		HLGs FE180 PH90/E30-E90 2x1 mm^2		
49	21		(N)HXH-J FE180 PH30/E30 4x50 RM	7	Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/.., ceownik CWOP 40H40/05, do betonu za pomocą tulei stalowej TRSO M10x 40
50			(N)HXH-J FE180 PH30/E30 4x50 RM		
51	22		(N)HXH-J FE180 PH30/E30 4x1.5 RE		
52			(N)HXH-J FE180 PH30/E30 4x1.5 RE		
53	60B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
54	60A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
55	61B		HLGs FE180 PH90/E30-E90 2x1 mm^2		
56	61A		HLGs FE180 PH90/E30-E90 2x1 mm^2		
57	27		NHXH-J FE180 PH90/E90 4x50 RM	8	Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFCO400 , pręt gwintowany PGM8/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M8x30
58			NHXH-J FE180 PH90/E90 4x50 RM		
59	28		NHXH-J FE180 PH90/E90 4x1.5 RE		
60			NHXH-J FE180 PH90/E90 4x1.5 RE		
61	64B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
62	64A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
63	65B		HTKSH FE180 PH90/E90 1x2x0,8		
64	65A		HTKSH FE180 PH90/E90 1x2x0,8		
65	34		NHXCH FE180 PH90/E90 4x50/25 RM	9	Korytko siatkowe KDSO 400H60/... B-400/ 1.5 m / 20kg/m / średnica pręta 4,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M10x 40
66	35		NHXCH FE180 PH90/E90 4x50/25 RM		
67	36		NHXH-J FE180 PH90/E90 4x50 RM		
68	37		NHXH-J FE180 PH90/E90 4x50 RM		
69	38		NHXH-J FE180 PH90/E90 4x1.5 RE		
70			NHXH-J FE180 PH90/E90 4x1.5 RE		
71	39		NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
72			NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
73	66B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
74	66A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
75	30		(N)HXH-J FE180 PH90/E90 4x50 RM	10	Korytko siatkowe KDSO 400H60/... B-400/ 1.5 m / 20kg/m / średnica pręta 4,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80 i tulei stalowej TRSO M10x 40
76	31		(N)HXH-J FE180 PH90/E90 4x50 RM		
77	29		(N)HXCH FE180 PH90/E90 4x50/25 RM		
78			(N)HXCH FE180 PH90/E90 4x50/25 RM		
79	32		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
80			(N)HXH-J FE180 PH90/E90 4x1.5 RE		
81	33		(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
82			(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		

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Príloha č./Appendix No. 32

Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
83	48		(N)HXH-J FE180 PH90/E90 4x50 RM	11	Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WPTO400 + podpórka wysięgnika PWO 400, Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80
84	49		(N)HXH-J FE180 PH90/E90 4x50 RM		
85	50		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
86			(N)HXH-J FE180 PH90/E90 4x1.5 RE		
87	51		NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
88			NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
89	68B		HTKSH FE180 PH90/E90 1x2x0,8		
90	68A		HTKSH FE180 PH90/E90 1x2x0,8		
91	42		(N)HXH-J FE180 PH90/E90 4x50 RM	12	Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WPTO400 + podpórka wysięgnika PWO 400, Mocowanie do betonu za pomocą śruby rozporowej PSRO M10x80
92	43		(N)HXH-J FE180 PH90/E90 4x50 RM		
93	44		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
94			(N)HXH-J FE180 PH90/E90 4x1.5 RE		
95	45		NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
96			NHXCH FE180 PH90/E90 4x1.5/1.5 RE		
97	67B		HTKSH FE180 PH90/E90 1x2x0,8		
98	67A		HTKSH FE180 PH90/E90 1x2x0,8		
99	54B		HLGs FE180 PH90/E30-E90 2x1 mm^2	13	Uchwyty kablowe UDF. Mocowanie do betonu co 600mm za pomocą kołków wstrzeliwanych Hilti
100	54A		HLGs FE180 PH90/E30-E90 2x1 mm^2		
101	55B		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
102	55A		HDGszo FE180 PH90/E30-E90 3x1.5 mm^2		
103	56B		HTKSHekw FE180 PH90/E90 1x2x0,8		
104	56A		HTKSHekw FE180 PH90/E90 1x2x0,8		
105	57B		HTKSH FE180 PH90/E90 1x2x0,8		
106	57A		HTKSH FE180 PH90/E90 1x2x0,8		
107	19		(N)HXH-J FE180 PH90/E90 4x50 RM	14	Uchwyt kablowy UKO1 + Szczebel SDOP 500 Mocowanie do betonu co 600 mm za pomocą śruby rozporowej SRO M6x30
108			(N)HXH-J FE180 PH90/E90 4x50 RM		
109	20		(N)HXCH FE180 PH90/E90 4x50/25 RM		
110			(N)HXCH FE180 PH90/E90 4x50/25 RM		
111	25		(N)HXH-J FE180 PH90/E90 4x1.5 RE		
112			(N)HXH-J FE180 PH90/E90 4x1.5 RE		
113	26		(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
114			(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE		
115	5		NHXH-J FE180 PH90/E90 4x1.5 RE	15	Puszka WKE 54. Mocowanie do betonu co 600 mm za pomocą śruby rozporowej SRO M6x30
116	4		NHXH-J FE180 PH90/E90 4x10 RE		
117	47		NHXH-J FE180 PH90/E90 4x1.5 RE	16	Puszka WKE 54. Mocowanie do betonu co 600 mm za pomocą śruby rozporowej SRO M6x30
118	46		NHXH-J FE180 PH90/E90 4x10 RE		
119	40		NHXCH FE180 PH90/E90 4x10/10 RE	17	Puszka WKE 54. Mocowanie do betonu co 600 mm za pomocą śruby rozporowej SRO M6x30
120	41		NHXCH FE180 PH90/E90 4x10/10 RE		

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Príloha č./Appendix No. 33

Zestawienie kabli Technokabel:

Lp	Symbol kaba		Średnica kabla	Ciężar kabla	Ilość
1	(N)HXH-J	FE 180 PH30/E30 4x 1,5 RE	14 mm	0,27 kg/m	4
2	(N)HXH-J	FE 180 PH30/E30 4x 50 RM	33 mm	2,8 kg/m	4
5	(N)HXH-J	FE 180 PH90/E90 4x 1,5 RE	14 mm	0,27 kg/m	8
6	(N)HXH-J	FE 180 PH90/E90 4x 50 RM	33 mm	2,8 kg/m	8
7	(N)HXHX-J	FE 180 PH90/E90 4x 1,5 RE	14 mm	0,27 kg/m	4
8	(N)HXHX-J	FE 180 PH90/E90 4x 50 RM	33 mm	2,8 kg/m	4
9	(N)HXCH	FE 180 PH90/E90 4x 1,5/1,5 RE	15 mm	0,32 kg/m	8
10	(N)HXCH	FE 180 PH90/E90 4x 50/25 RM	34 mm	3,0 kg/m	8
11	NHXH-J	FE 180 PH90/E90 4x 1,5 RE	14 mm	0,26 kg/m	12
12	NHXH-J	FE 180 PH90/E90 4x 50 RM	33 mm	2,6 kg/m	10
13	NHXH-J	FE 180 PH90/E90 4x 10 RE	19 mm	0,7 kg/m	2
14	NHXCH	FE 180 PH90/E90 4x 1,5/1,5 RE	15 mm	0,33 kg/m	6
15	NHXCH	FE 180 PH90/E90 4x 50/25 RM	35 mm	3,0 kg/m	6
16	NHXCH	FE 180 PH90/E90 4x 10/10 RM	22 mm	0,9 kg/m	2
17	HDGszo	FE180 PH90/E30-E90 3x1,5 RE	8 mm	0,1 kg/m	16
18	HLGs	FE180 PH90/E30-E90 2x1,0 mm^2	7 mm	0,1 kg/m	6
19	HTKSH	FE180 PH90/E30-E90 1x2x0,8 mm	8 mm	0,1 kg/m	10
20	HTKSHekw	FE180 PH90/E30-E90 1x2x0,8 mm	8 mm	0,1 kg/m	2

Puszki typu WKE 54 – sztuk 6 firmy SPELSBERG elektro Sp. z o.o.

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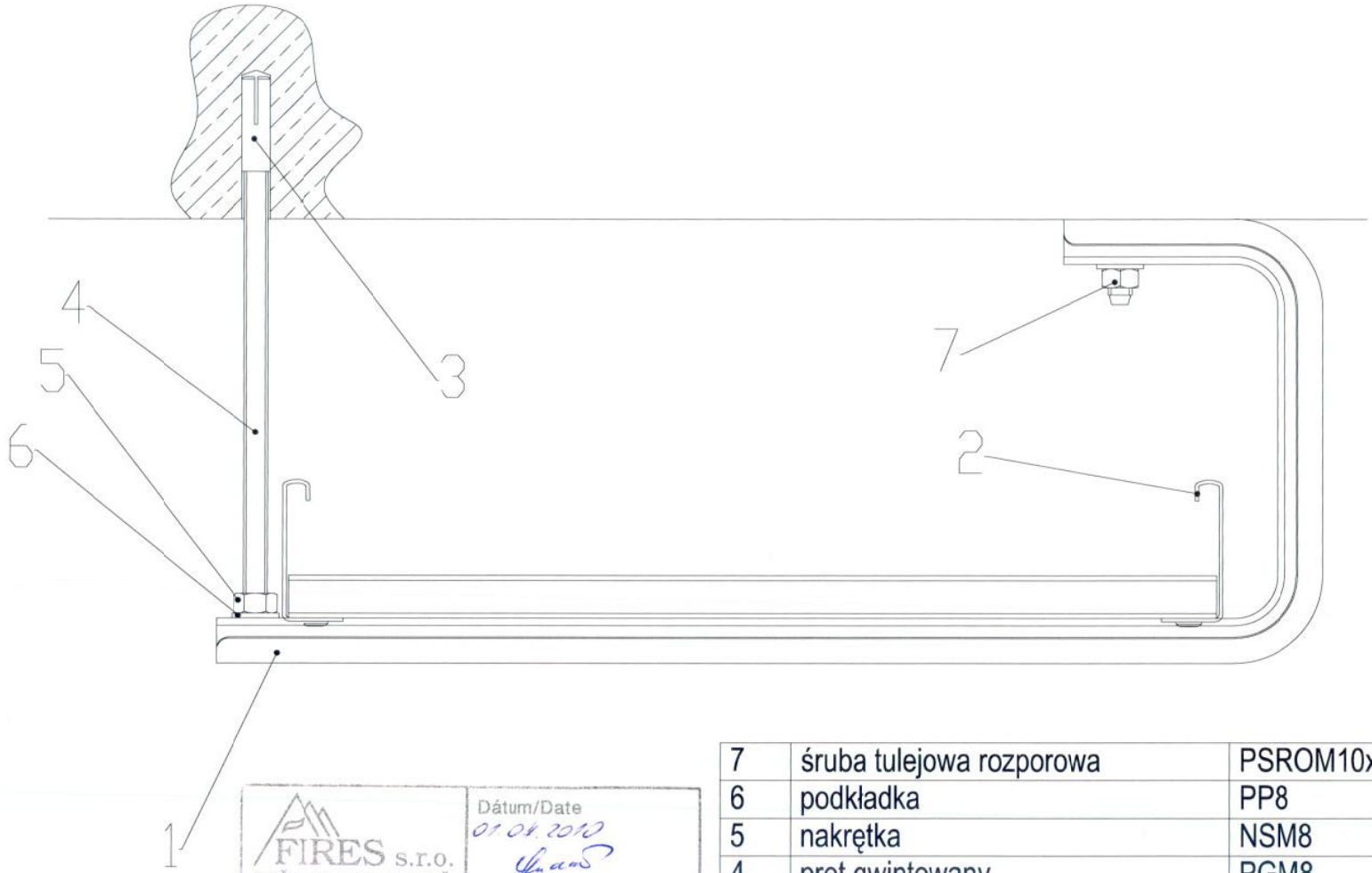
Príloha č./Appendix No. 34



7	śruba tulejowa rozporowa	PSROM10x80	1
6	podkładka	PP8	2
5	nakrętka	NSM8	2
4	pręt gwintowany	PGM8	1
3	tuleja rozporowa stalowa	TRSOM8	1
2	drabikna	DGOP400H60/3	1
1	wspornik fajkowy	WFCO400	1
LP.	NAZWA	SYMBOL	szt.

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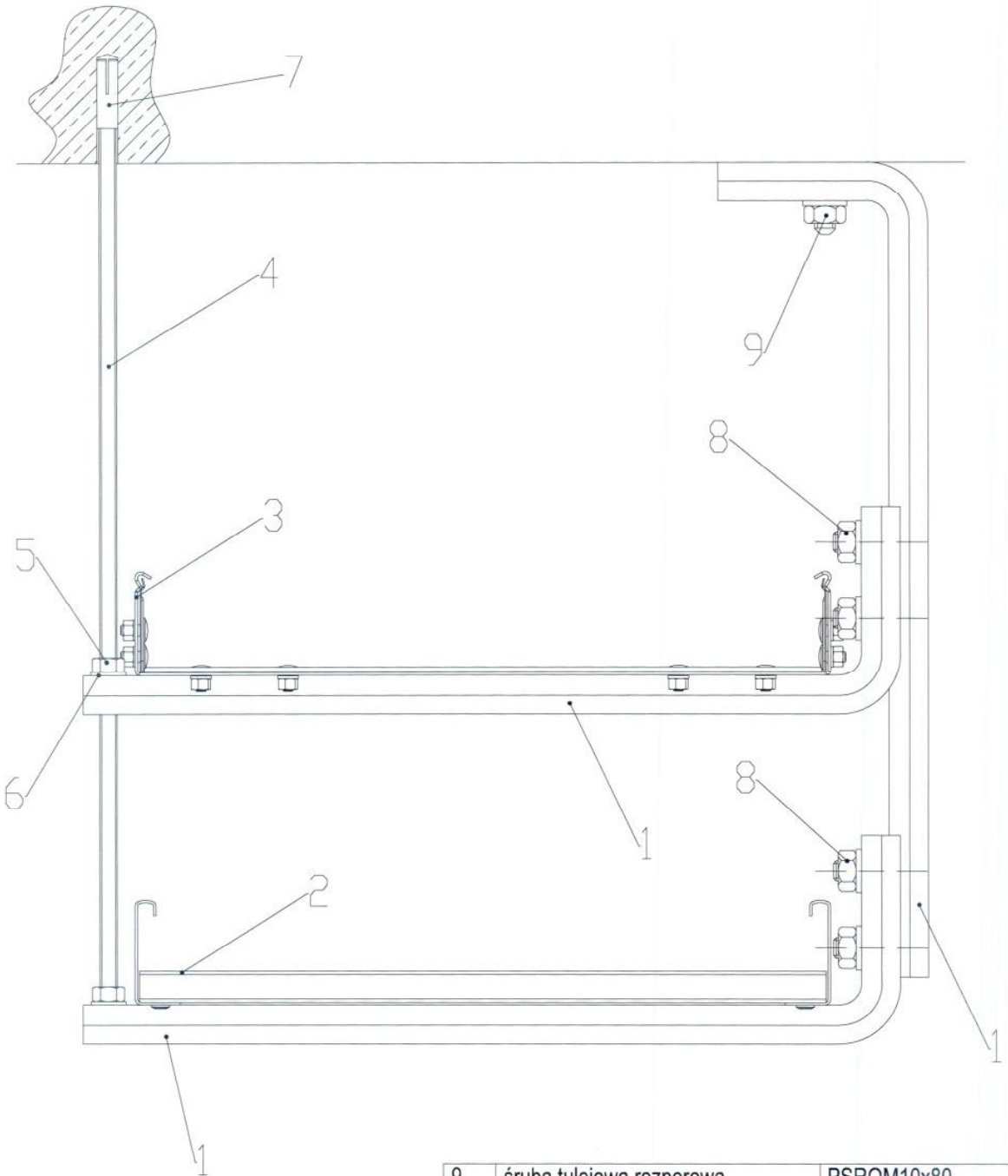
Príloha č./Appendix No. 35



9	śruba tulejowa rozporowa	PSROM10x80	1
8	śruba	SMM10x30	4
7	tuleja rozporowa stalowa	TRSOM10	1
6	podkładka	PP10	4
5	nakrętka	NSM10	4
4	pręt gwintowany	PGM10	1
3	korytko	KCOP400H60/3	1
2	drabikna	DGOP400H60/3	1
1	wspornik fajkowy	WFCO400	3
LP.	NAZWA	SYMBOL	szt.

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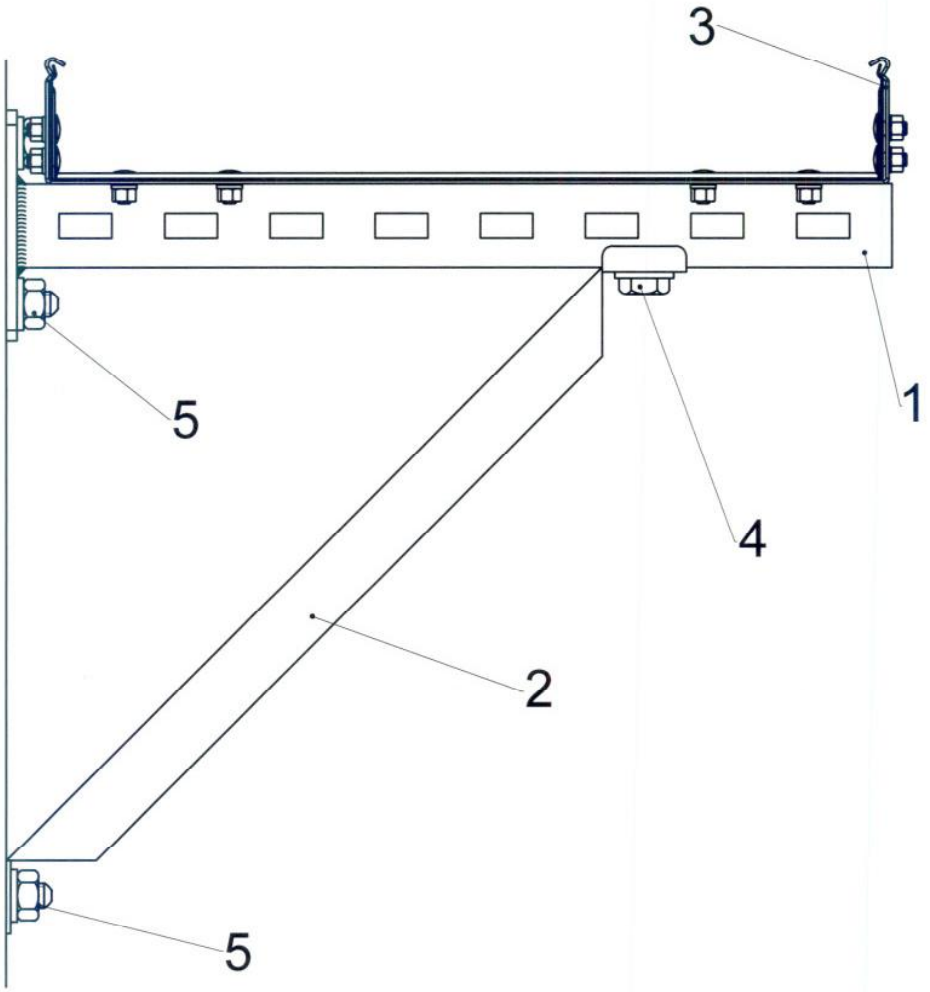
Príloha č./Appendix No. 36



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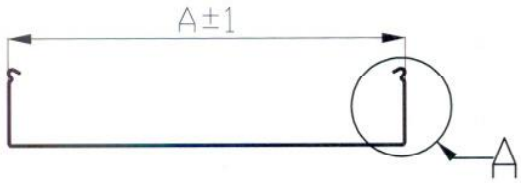
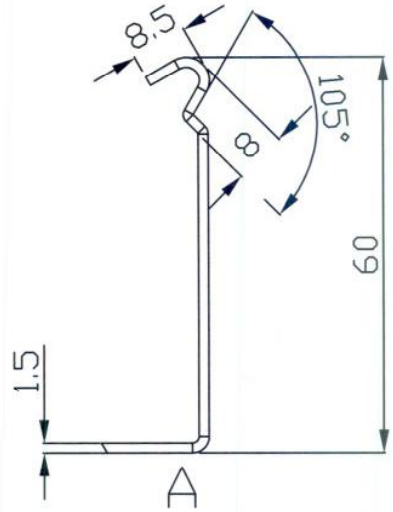
5	śruba tulejowa rozporowa	PRSOM10x80	3
4	śruba	SRM10x30	1
3	korytko	KCOP400H60/3	1
2	podpórka	XXX	1
1	wysięgnik	WPT400	1
LP.	NAZWA	SYMBOL	szt.

A	Typ	Nr.kat
100	KCOP100H60/3N	862010
200	KCOP200H60/3N	862020
300	KCOP300H60/3N	862030
400	KCOP400H60/3N	862040





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FIRE RESISTANCE
Dátum/Date 01.08.2010
Podpis/Signature
Dokument č./Document No. FIRES-FR-124-10-ANNEX
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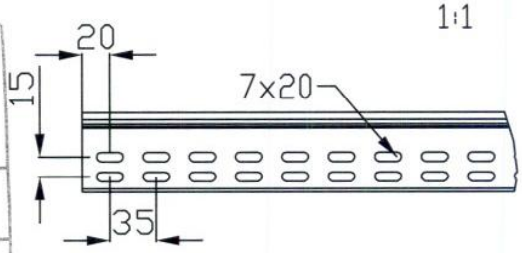
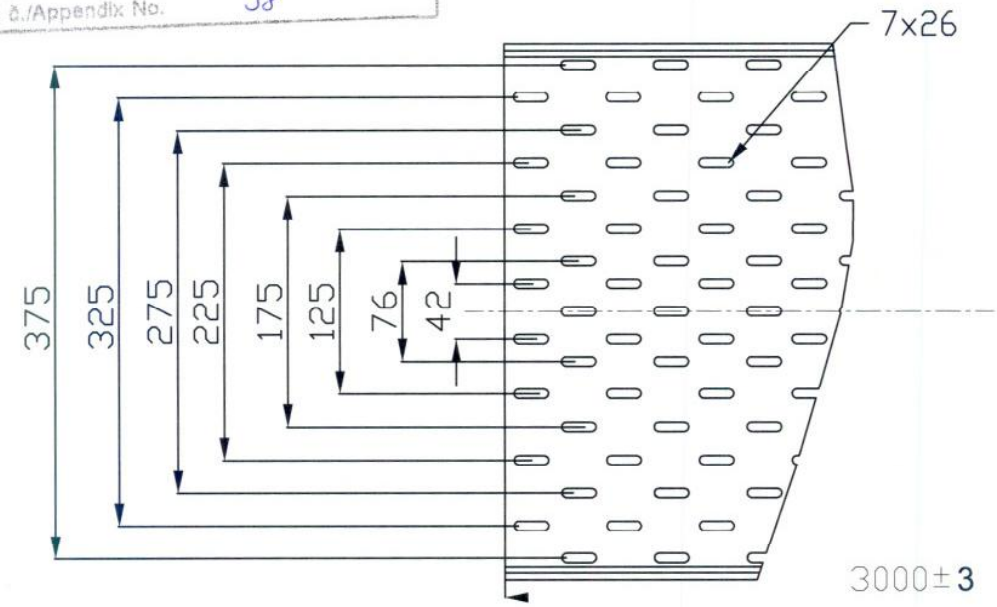




3000±3

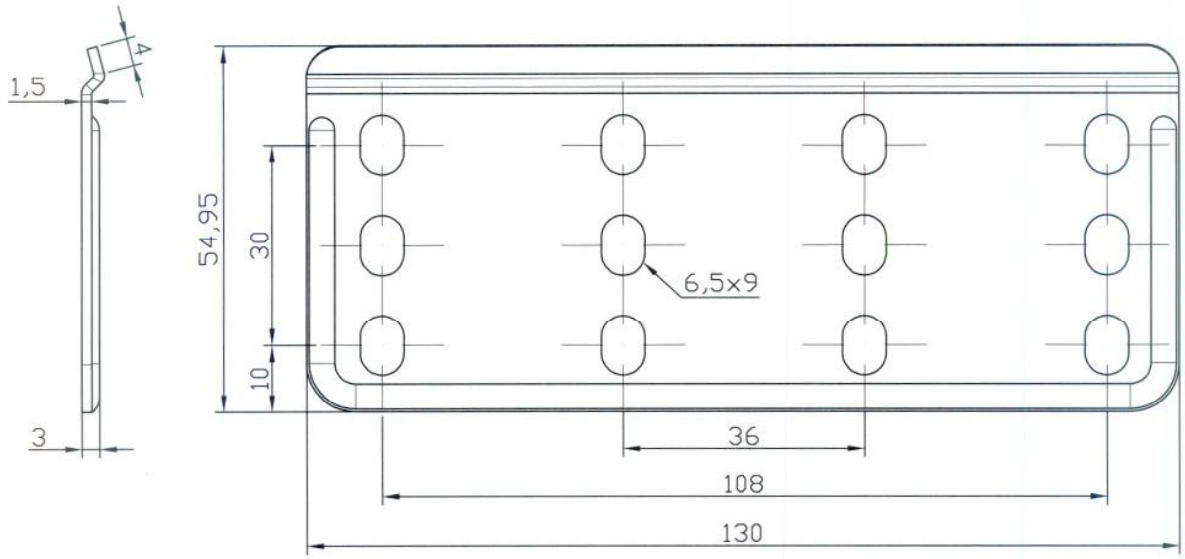
Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy	PN-EN 10142 + A1 : 1997			Arkusz
			półfabrykat (nr normy)				Arkuszy

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	J.GROCHOWSKI		20.10.05	KCOP400H60/3N
Rysował	J.Grochowski		20.10.05	
Sprawdził	T.WŁODARCZYK		20.10.05	
Zatwierdził	J.KLICZEK		20.10.05	Nr programu maszynowego

Profesjonalne Systemy Tras Kablowych

Nr rysunku 862040

Nr zmiany



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Dátum/Date 01.04.2010

Podpis/Signature

Dokument č. / Document No. FIRES-FR-121-10-ANNEX

Príloha č./Appendix No. 39

	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:1	Format A4
				Nr normy	PN-EN 10327:2005			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko J.GROCHOWSKI	Podpis	Data 20.10.05	Nazwa rysunku LPOPH60N				
Rysował	J.Grochowski		20.10.05					
Sprawdził	T.WŁODARCZYK		20.10.05					
Zatwierdził	J.KLICZEK		20.10.05					Nr zmiany
BAKS	Profesjonalne Systemy Tras Kablowych			Nr rysunku 860700				

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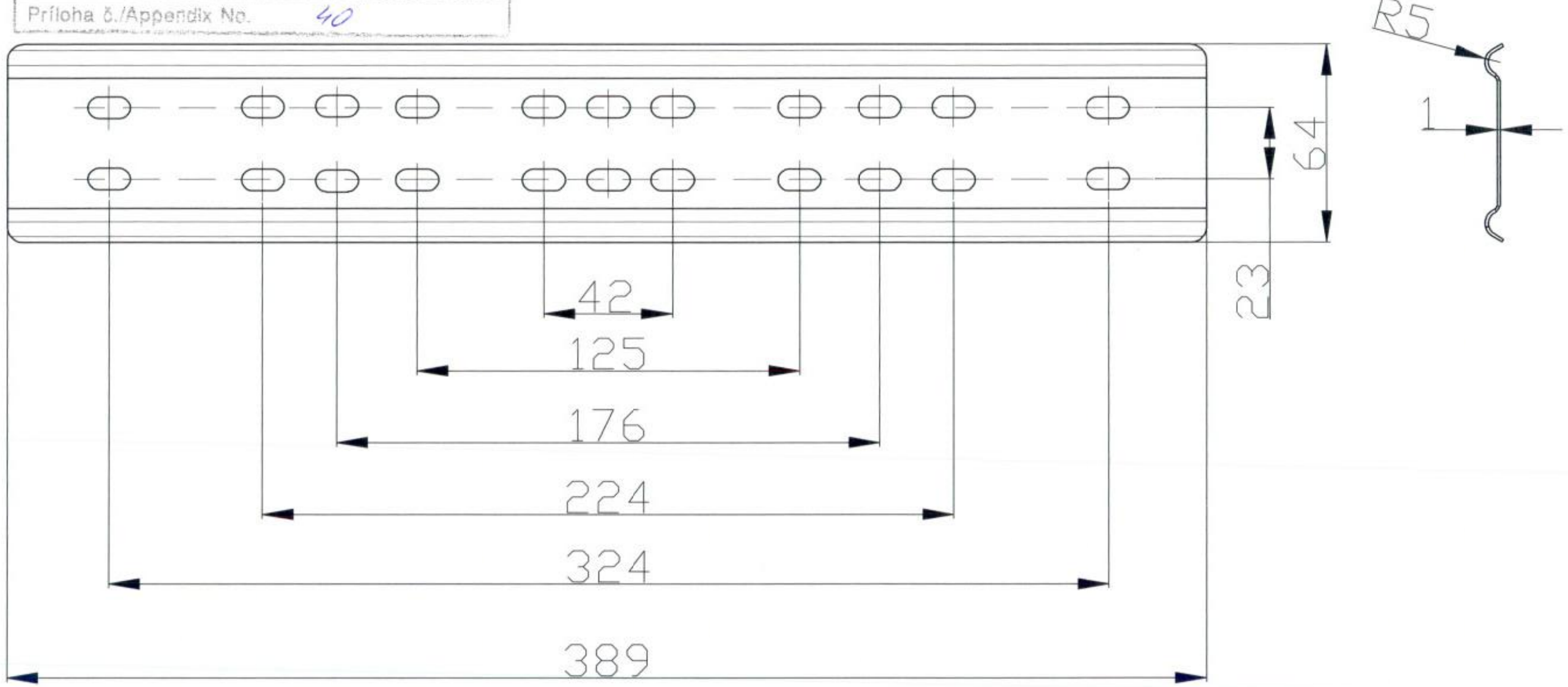
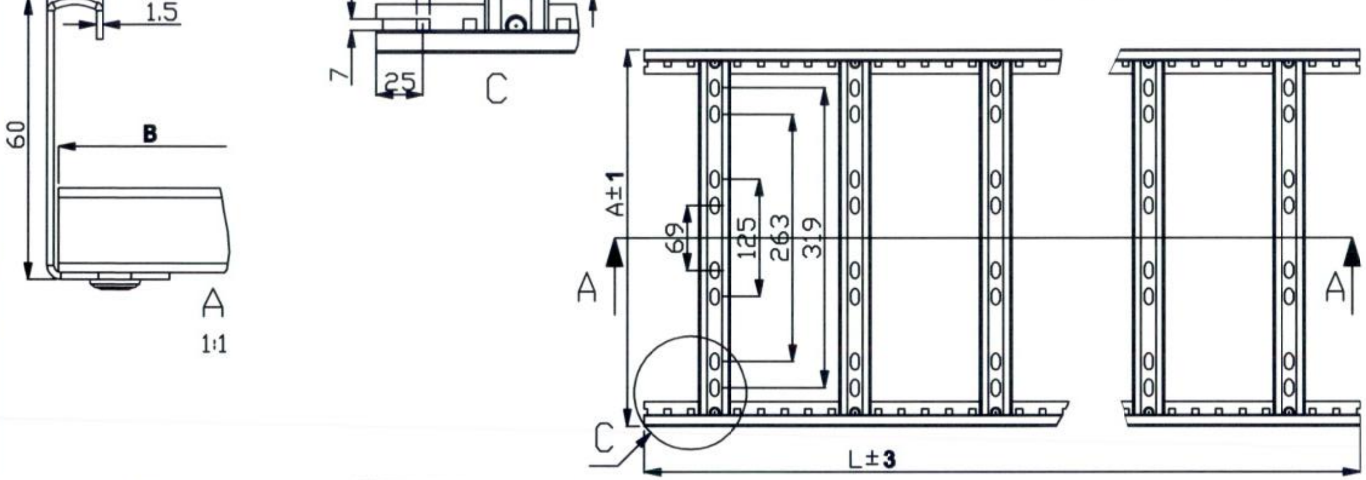
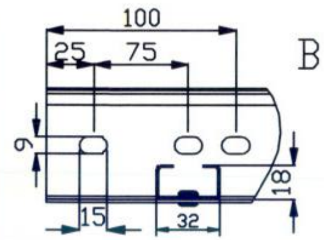
Príloha č./Appendix No. 40	



Odchyłka wymiarów nietolerowanych		Materiał: Gatunek / Nr normy / półfabrykat (nr normy)	PN-EN 10327:2005	Masa (kg) 0,13	Podziałka 1:1	Format A2 / Arkusz / Arkuszy
Projektował	J.GROCHOWSKI	20.10.05	Nazwa rysunku			
Rysował	J.Grochowski	20.10.05	BL□400N			
Sprawdził	T.WLODARCZYK	20.10.05				
Zatwierdził	J.KLICZEK	20.10.05	Blacha łącznikowa			Nr zmiany
Profesjonalne Systemy Tras Kablowych			Nr rysunku 862420			





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Podpis/Signature

Dokument č. / Document No. FIRES-FR-121-10-AUNE

Príloha č./Appendix No. 41

DGDP400H60/6N	400	6000	863040
DGDP300H60/6N	300	6000	863030
DGDP200H60/6N	200	6000	863020
DGDP100H60/6N	100	6000	863010
DGDP400H60/3N	400	3000	863043
DGDP300H60/3N	300	3000	863033
DGDP200H60/3N	200	3000	863023
DGDP100H60/3N	100	3000	863013
Typ	Szerokość A (mm)	Długość L (mm)	Nr. Kat

Odchyłka wymiarów nietolerowanych	Grubość (mm)	1,5
Materiał	Gatunek	Blacha stal.cynk.met.Sędzimira
	Nr normy	PN-EN 10327:2005
	półfabrykat (nr normy)	
Masa (kg)	Podziałka	Format A3
Projektował	J.GROCHOWSKI	20.10.05
Rysował	J.Grochowski	20.10.05
Sprawdził	T.WLODARCZYK	20.10.05
Zatwierdził	J.KLICZEK	20.10.05
Nazwa rysunku	DGDP400H60/3N	
Nr programu	---	Nr zmiany

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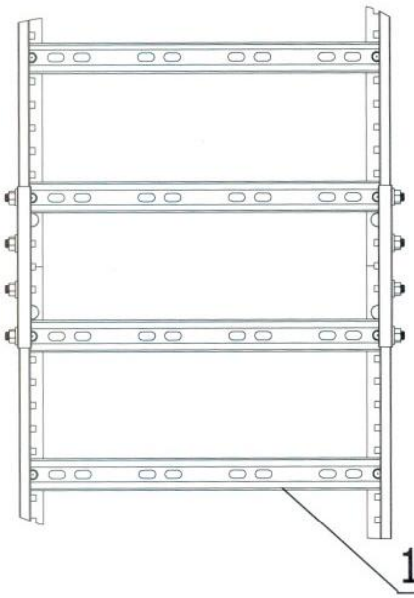

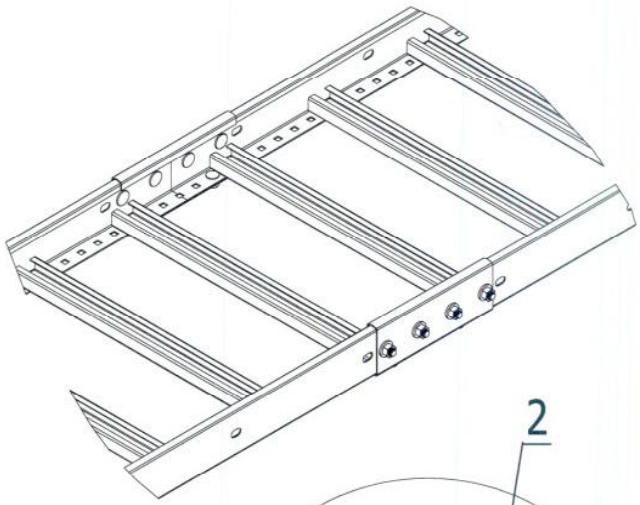

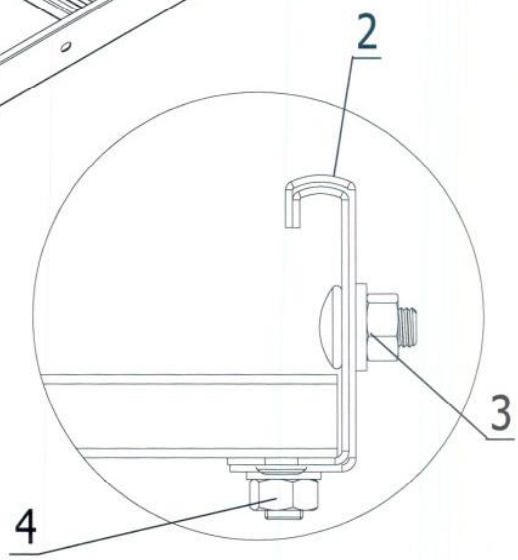

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Dokument č. / Document No. FIRES-FR-124-10-ANNEX

Príloha č./Appendix No. 4R

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
4	śruba	SGN M6x12		4	650442
3	śruba	SGN M8x14		8	650142
2	łącznik	LDDNCH60		2	863000
1	DRABINKA	DGDNP400H60		1	863043

Dachylka wymiarów nietolerowanych

Material: Gatunek; Nr normy: PN-EN 10327:2005; półfabrykat (nr normy)

Masa [kg]

Podziałka: 7:50

Format: A4

Arkusz: 1

Arkuszy: 1

	Nazwisko	Podpis	Data
Projektował			
Rysował	J.Grochowski		21-Nov-06
Sprawdził			
Zatwierdził			

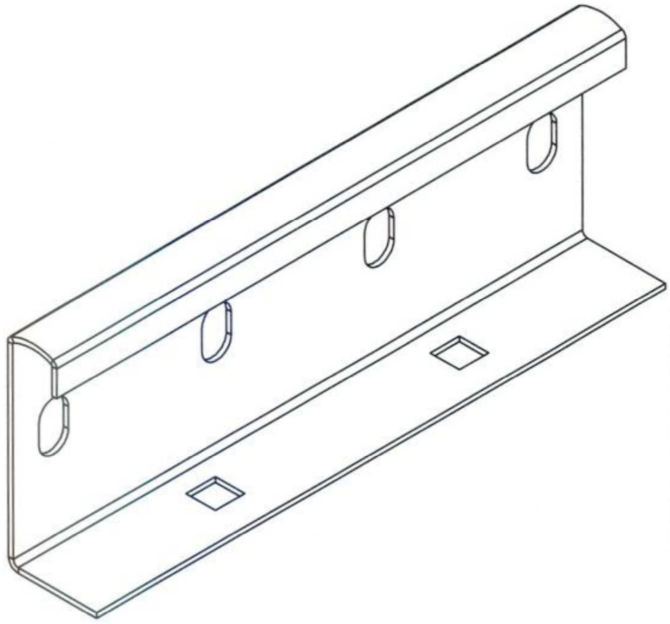
Nazwa rysunku

Nr programu maszynowego

Nr rysunku

Nr zmiany

Profesjonalne Systemy Tras Kablowych



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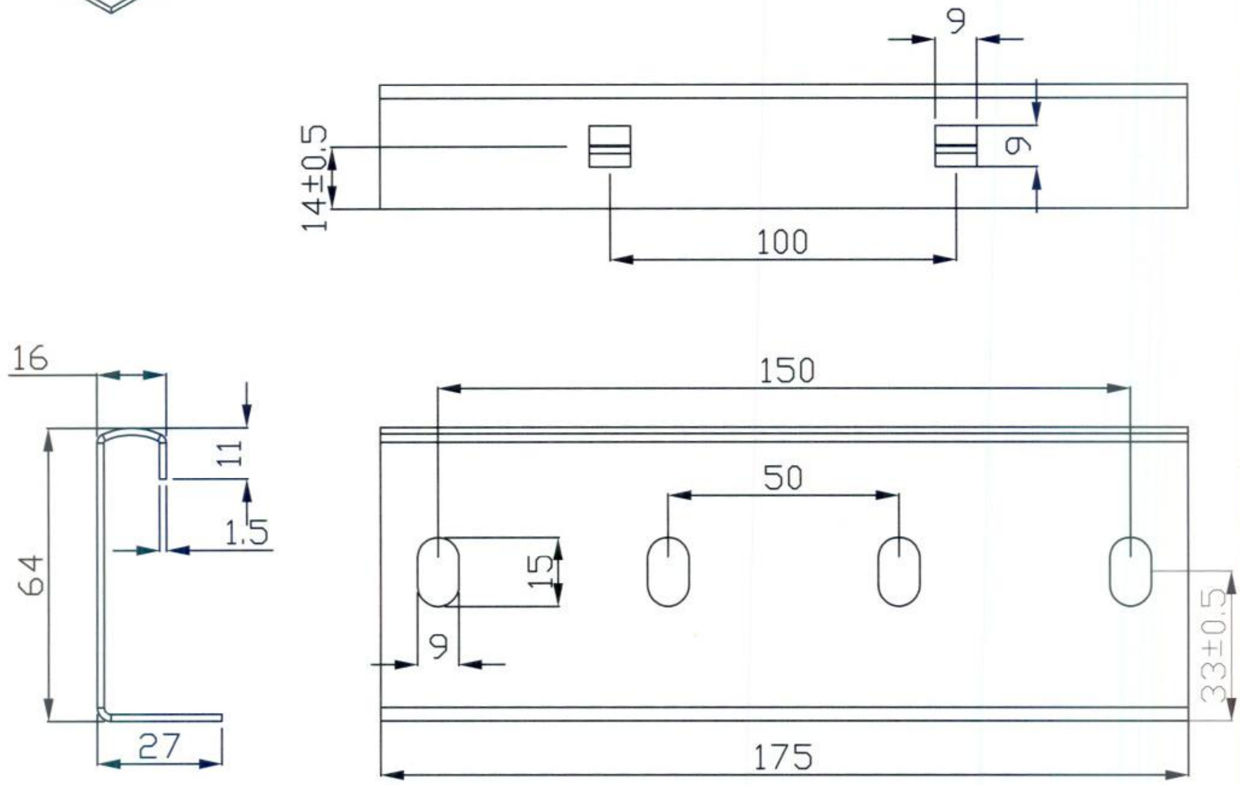
Dokument č. Document No.	FIRES-FR-121-10-AUVE
Príloha č./Appendix No.	43



	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy				Arkusz
				półfabrykat (nr normy)				Arkuszy

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	J.GROCHOWSKI		20.10.05	LDONCH60
Rysował	J.Grochowski		20.10.05	
Sprawdził	T.WLODARCZYK		20.10.05	
Zatwierdził	J.KLICZEK		20.10.05	Nr programu Nr zmiany

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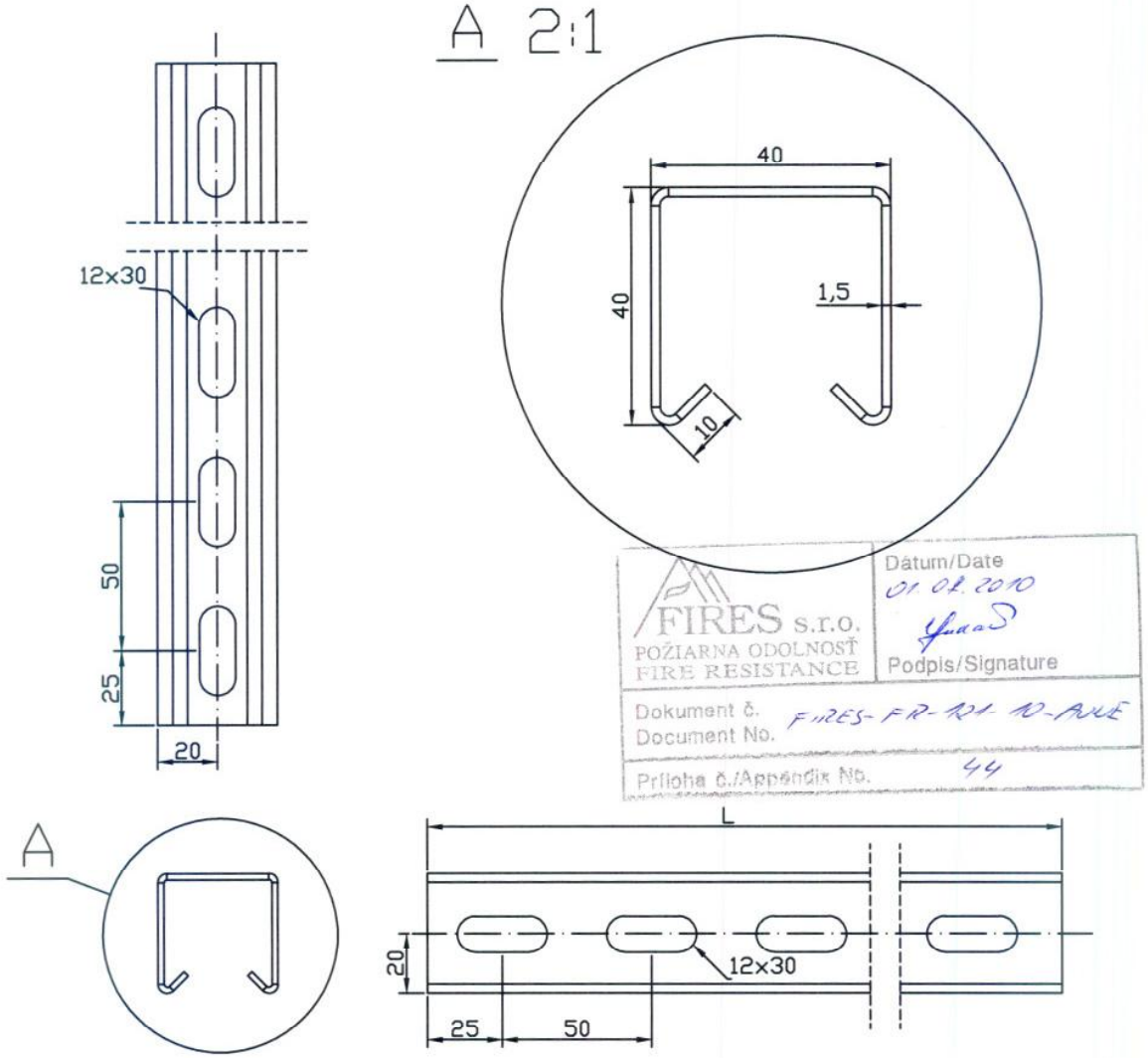
Nr rysunku: 863000



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Dokument č. / Document No. FIRES-FR-101-10-AKLE

Príloha č./Appendix No. 44

LP	Nazwa wyrobu	Symbol	Nr Katalogowy	L [mm]	Masa [kg]
5	Ceownik wzmocniony	CW□P40H40/ 2	805320	2000	3,50
4	Ceownik wzmocniony	CW□P40H40/05	805305	500	0,88
3	Ceownik wzmocniony	CW□P40H40/04	805304	400	0,70
2	Ceownik wzmocniony	CW□P40H40/03	805303	300	0,53
1	Ceownik wzmocniony	CW□P40H40/02	805302	200	0,35

Odchyłka wymiarów nietolerowanych	Grubość (mm) 1,5	Materiał: Gatunek	Blacha kwasoodporna	Masa [kg] ---	Podziałka 1:1	Format A4
		Nr normy	PN 0H18N9			Arkusz --
		półfabrykat (nr normy)	-----			Arkuszy --

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	Jacek Grochowski		20.10.05	CW□P40H40/...
Rysował	Jakub Rudak		20.02.08	
Sprawdził	Jacek Kliczek		20.02.08	
Zatwierdził	Jacek Kliczek		20.02.08	Nr zmiany

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Nr rysunku 8053.....

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01.04.2010
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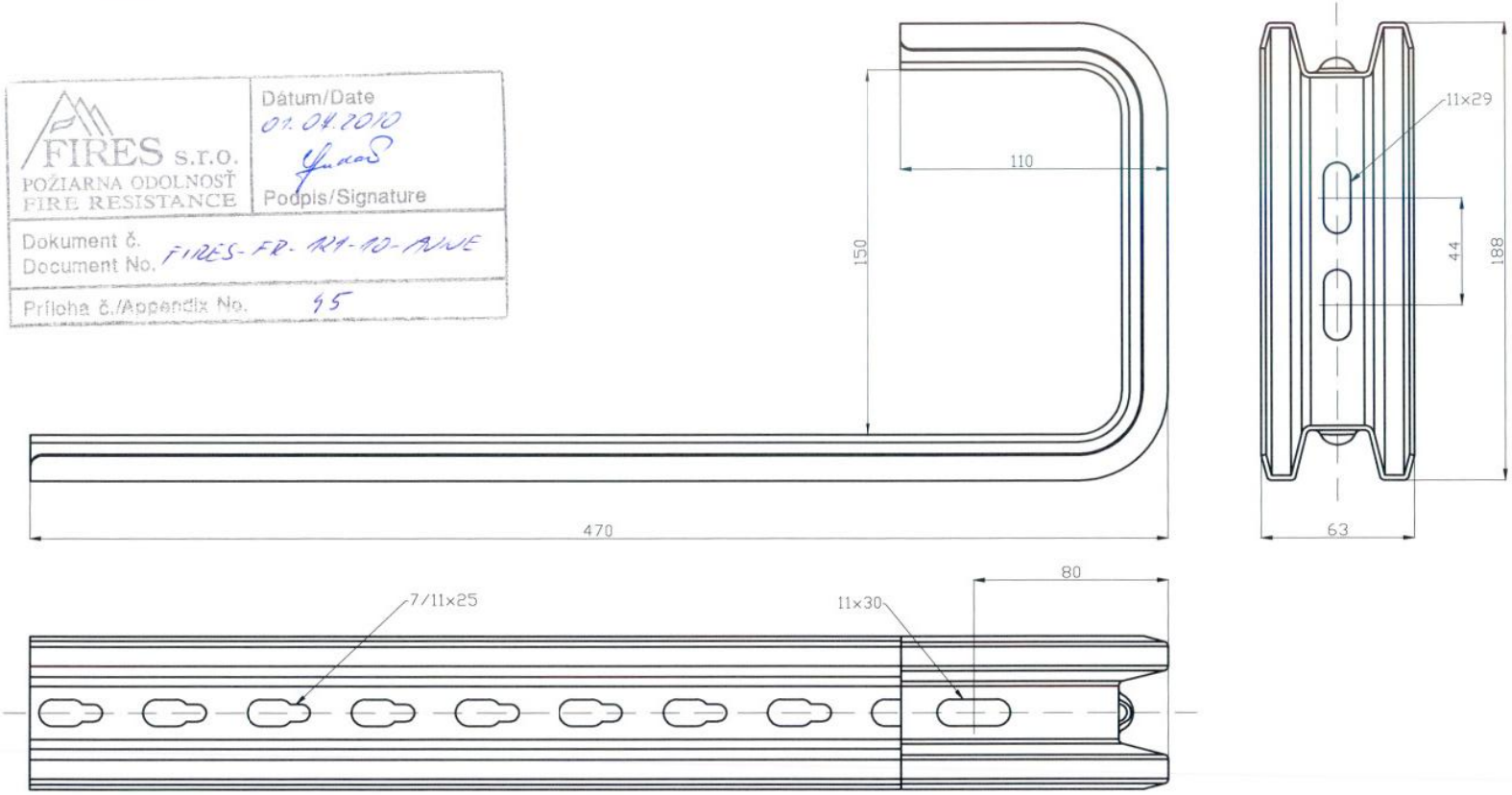
Dokument č.
Document No. FIRES-FR-RH-10-AUVE

Príloha č./Appendix No. 45



	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		---	4:1	Arkusz
			półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysował	G.Matuszewski		04.06.10	WFC□400			
Sprawdził							Nr zmiany
Zatwierdził							
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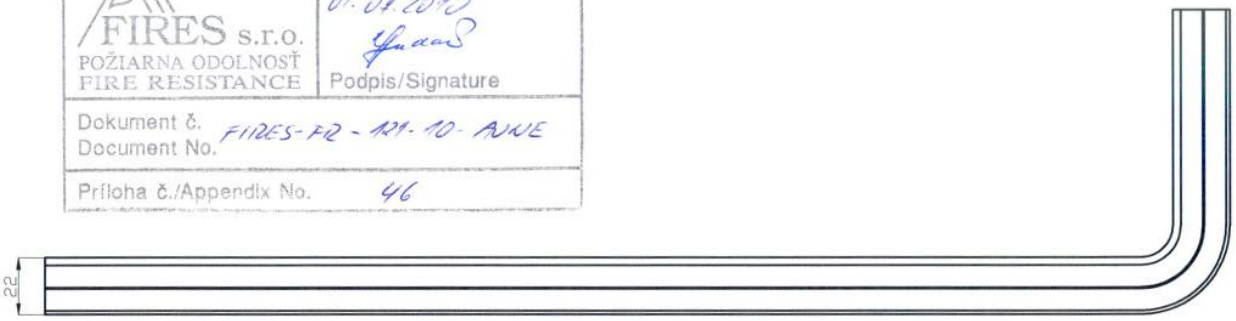
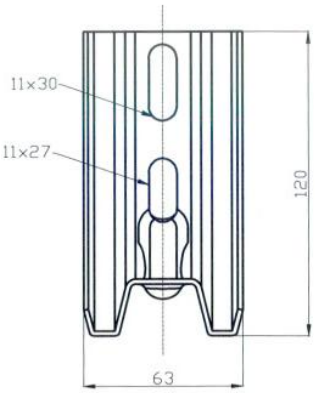
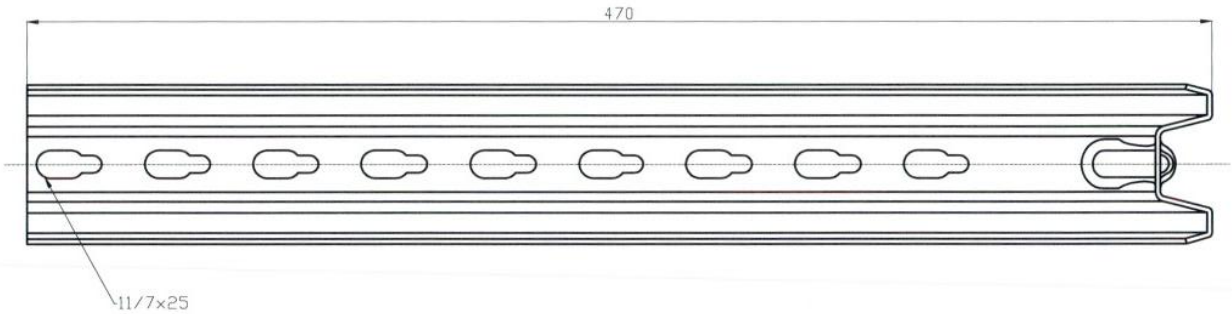
Document No. FIRES-FR-121-10-ANNEX

Príloha č./Appendix No. 46







Odchylka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
		Nr normy		---	4:1	Arkusz
		półfabrykat (nr normy)				Arkuszy

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował				WFL 400
Rysował	G.Matuszewski		04.06.10	
Sprawdził				
Zatwierdził				Nr zmiany

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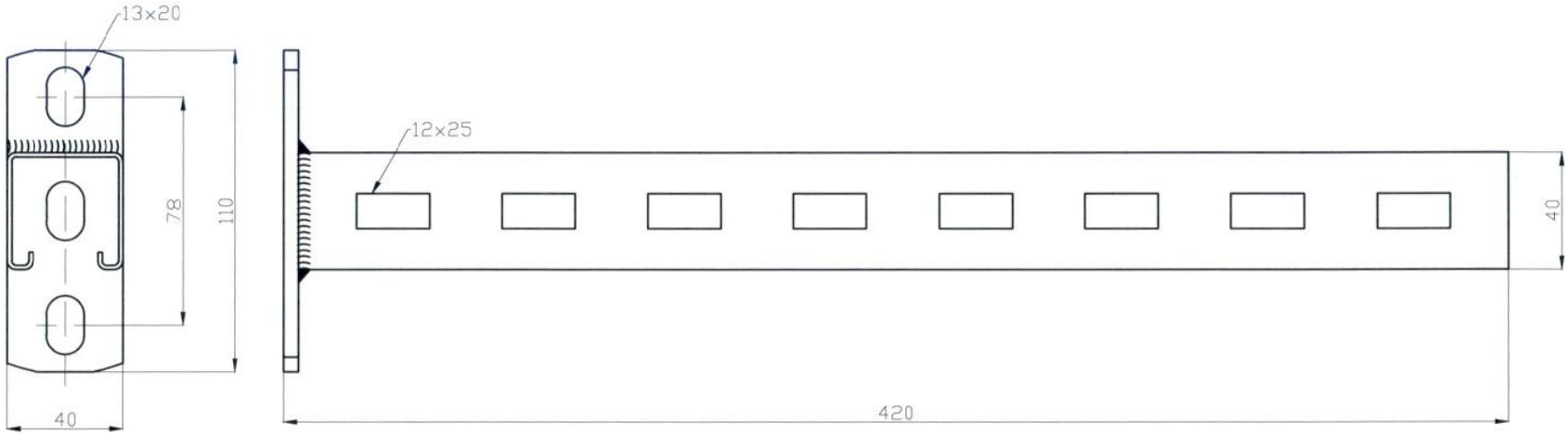
Nr rysunku
— — —



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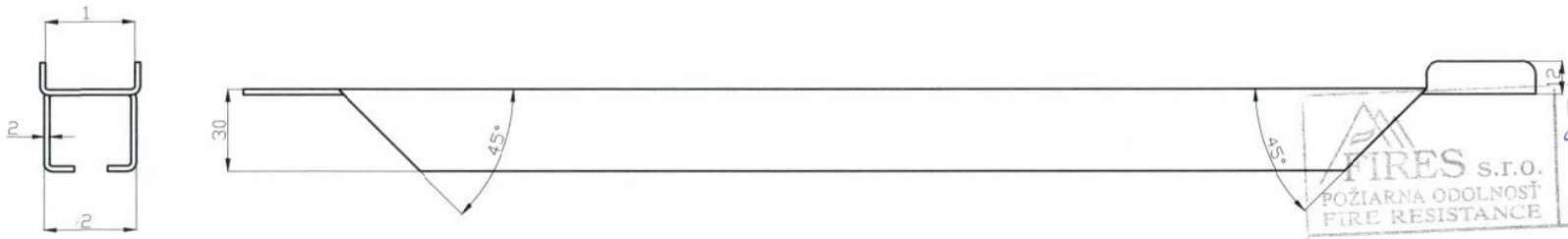
Dokument č./Document No. FIRES-FR-127-10-ANNE

Príloha č./Appendix No. 4/1

	Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		---	4:1	Arkusz
			półfabrykat (nr normy)				Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysował	G.Matuszewski		04.06.10	WPT□400			
Sprawdził							
Zatwierdził							Nr zmiany
BAKS	Profesjonalne Systemy Tras Kablowych			Nr rysunku ---			



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Dokument č.
Document No. FIRES-FR-12-D-AK

Príloha č./Appendix No. 48

Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
			Nr normy		---	4:1	Arkusz
			półfabrykat (nr normy)				Arkuszy

Projektował	Nazwisko	Podpis	Data	Nazwa rysunku	
Rysował	G.Matuszewski		04.06.10	PODORA	
Sprawdził					
Zatwierdził					Nr zmiany

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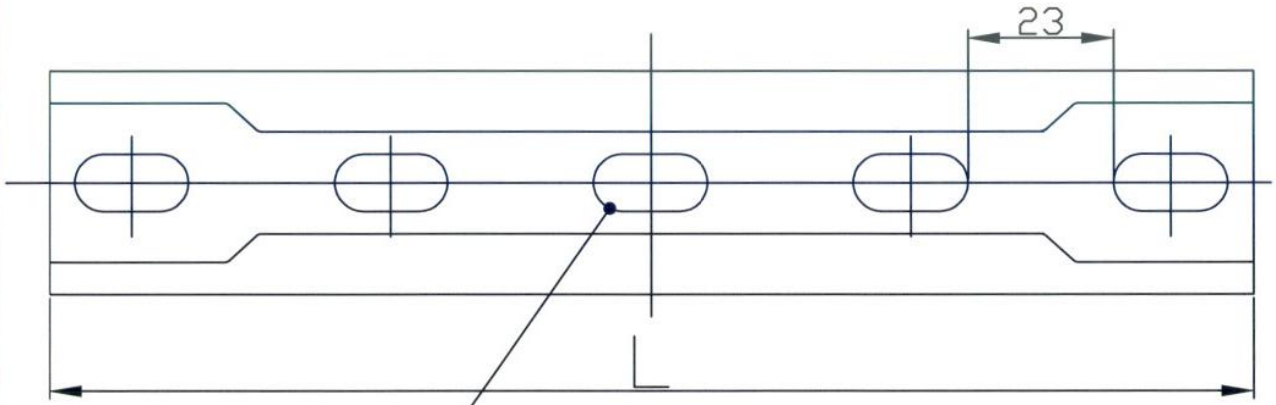
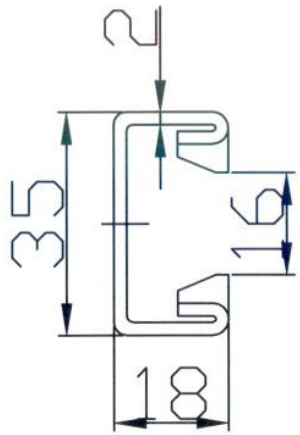
Nr rysunku
— — —





L.p.	Nazwa wyrobu	Symbol	L	Masa (kg)/szt.	Materiał	Nr katalogowy
8.	Szczebel	SDOC 1000	990	1,30	BLACH KWASOODPORNA	800191
7.	Szczebel	SDOC 800	790	1,04	BLACH KWASOODPORNA	800181
6.	Szczebel	SDOC 600	590	0,78	BLACH KWASOODPORNA	800161
5.	Szczebel	SDOC 500	490	0,65	BLACH KWASOODPORNA	800151
4.	Szczebel	SDOC 400	390	0,52	BLACH KWASOODPORNA	800141
3.	Szczebel	SDOC 300	290	0,39	BLACH KWASOODPORNA	800131
2.	Szczebel	SDOC 200	190	0,26	BLACH KWASOODPORNA	800121
1.	Szczebel	SDOC 100	90	0,13	BLACH KWASOODPORNA	800111

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Datum/Date 01.01.2010

Podpis/Signature

Dokument č. / Document No. FIRES-FR-RT-10-ANNEX

Príloha č./Appendix No. 49

Odchyłka wymiarów nietolerowanych

Materiał: Gatunek ----- | Nr normy ----- | półfabrykat (nr normy) -----

Masa [kg]: -----

Podziałka: 1:1

Format A2 | Arkusz | Arkuszy

	Nazwisko	Podpis	Data
Projektował			
Rysował	G.Matuszewski		28.01.09
Sprawdził			
Zatwierdził			

Nazwa rysunku: SZCZEBEL SDOC...

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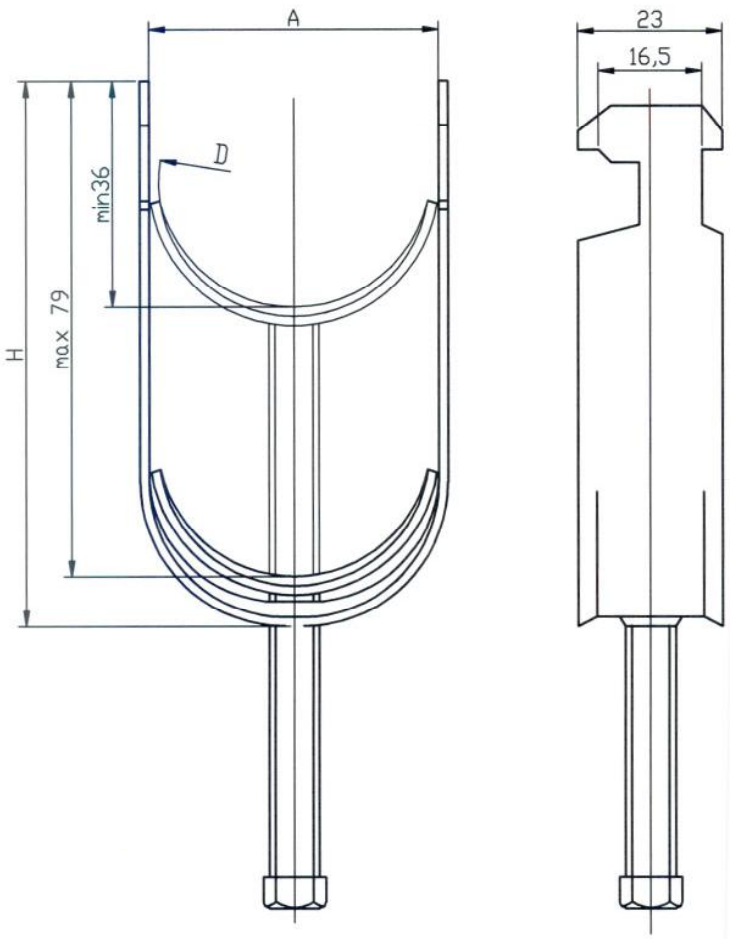
Nr katalogu



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Dokument č./Document No. FIRES-FR-124-10-PUNE

Príloha č./Appendix No. 50

UK□1/58-64	66	103	64
UK□1/46-52	54	97	52
UK□1/40-46	48	86	46
UK□1/34-40	42	78	40
UK□1/28-34	36	71	34
UK□1/22-28	30	61	28
UK□1/16-22	24	57	22
SYMBOL	A	H	ØD

Odchyłka wymiarów nietolerowanych

Materiał: Gatunek; Nr normy; półfabrykat (nr normy)

Masa [kg]: -----

Podziałka: 1:1

Format: A4; Arkusz: 1; Arkuszy: 1

	Nazwisko	Podpis	Data
Projektował	T.Grudniewski		2004.12.29
Rysował	J.Jasiński		2004.12.29
Sprawdził	J.Kliczek		2004.12.29
Zatwierdził	J.Kliczek		2004.12.29

Nazwa rysunku: UK□1/40-46

Nr programu maszynowego: ---

Nr zmiany

Nr rysunku

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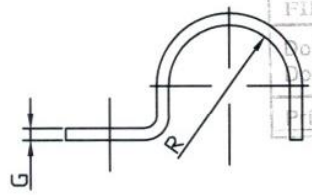
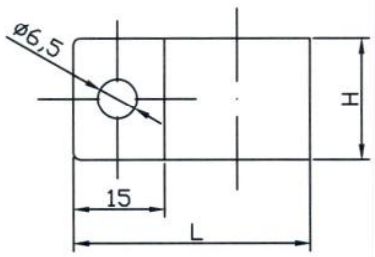




LP	Nazwa wyrobu	Symbol	Nr Katalogowy	R [mm]	L [mm]	H [mm]	G [mm]
20	Uchwyt kabla	UDF 43	405543	21,5	60,0	20,0	2,0
19	Uchwyt kabla	UDF 40	405540	20,0	57,0	20,0	2,0
18	Uchwyt kabla	UDF 37	405537	18,5	54,0	20,0	2,0
17	Uchwyt kabla	UDF 34	405534	17,0	51,0	20,0	2,0
16	Uchwyt kabla	UDF 31	405531	15,5	48,0	20,0	2,0
15	Uchwyt kabla	UDF 28	405528	14,0	45,0	20,0	2,0
14	Uchwyt kabla	UDF 25	405525	12,5	44,0	20,0	2,0
13	Uchwyt kabla	UDF 22	405522	11,0	41,0	14,0	2,0
12	Uchwyt kabla	UDF 20	405520	10,0	39,0	14,0	2,0
11	Uchwyt kabla	UDF 18	405518	9,0	37,0	14,0	2,0
10	Uchwyt kabla	UDF 16	405516	8,0	35,0	14,0	2,0
9	Uchwyt kabla	UDF 15	405515	7,5	34,0	14,0	2,0
8	Uchwyt kabla	UDF 14	405514	7,0	33,0	14,0	1,2
7	Uchwyt kabla	UDF 12	405512	6,0	30,0	14,0	1,2
6	Uchwyt kabla	UDF 10	405510	5,0	28,0	14,0	1,2
5	Uchwyt kabla	UDF 9	405509	4,5	27,0	14,0	1,2
4	Uchwyt kabla	UDF 8	405508	4,0	26,0	14,0	1,2
3	Uchwyt kabla	UDF 7	405507	3,5	25,0	14,0	1,2
2	Uchwyt kabla	UDF 6	405506	3,0	24,0	14,0	1,2
1	Uchwyt kabla	UDF 5	405505	2,5	23,0	14,0	1,2

Odchyłka wymiarów nietolerowanych: ±0,5

Materiał: Gatunek; Nr normy: PN-EN 10327:2005; półfabrykat (nr normy): -----

Masa [kg]: ---

Podziałka: 1:1

Format A4; Arkusz --; Arkuszy --

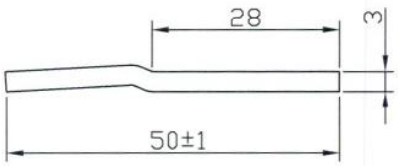
	Nazwisko	Podpis	Data
Projektował	Jacek Grochowski		20.10.05
Rysował	Jakub Rudak		20.02.08
Sprawdził	Jacek Kliczek		20.02.08
Zatwierdził	Jacek Kliczek		20.02.08

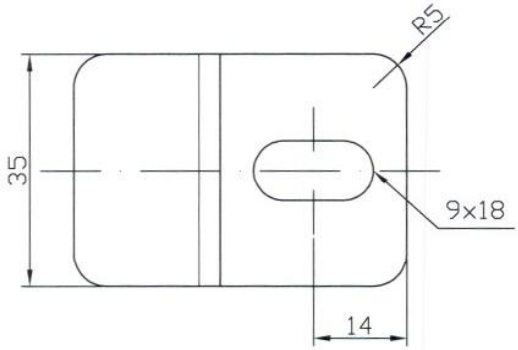
Nazwa rysunku: UDF 5-43

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 4055.....





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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01.09.2010

Podpis/Signature

Dokument č. / Document No. FIRES-FR-121-10-AUNE

Príloha č./Appendix No. 52

	Odchyłka wymiarów nietolerowanych	±0,5	Materiał	Gatunek	-----	Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005	0,025	1:1	Arkusz --
				półfabrykat (nr normy)	-----			Arkuszy --

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	Tomasz Grudniewski		29.12.04	ZMOE
Rysował	Jakub Rudak		20.02.08	
Sprawdził	Jacek Kliczek		20.02.08	
Zatwierdził	Jacek Kliczek		20.02.08	Nr zmiany

BAKS

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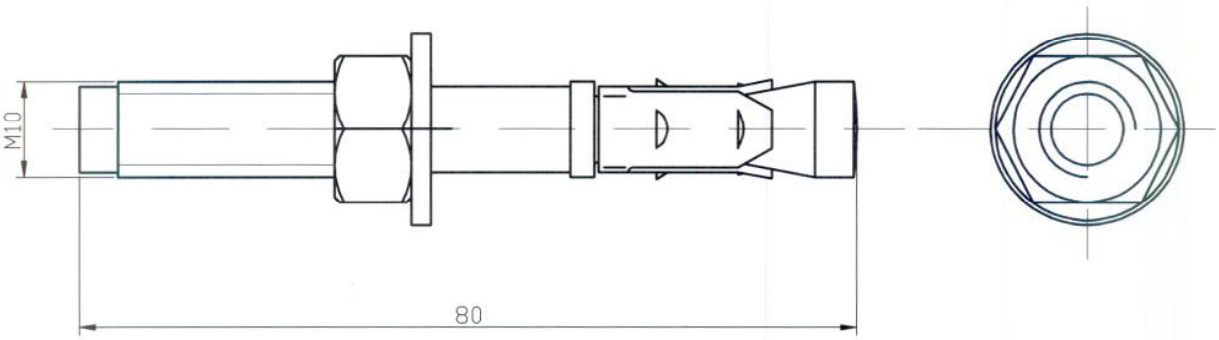
Nr rysunku 802900



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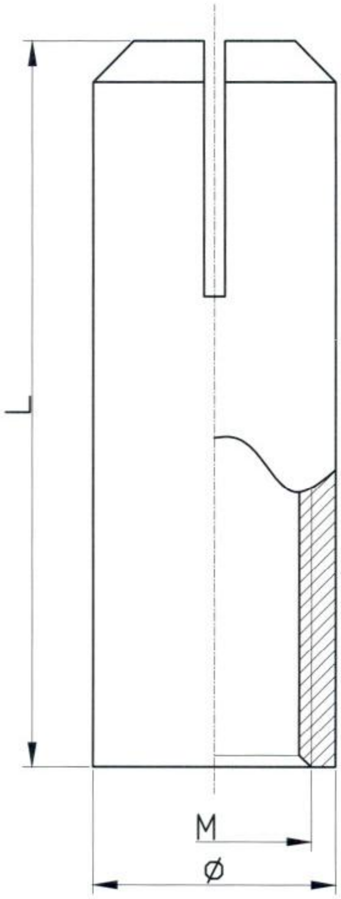
Dátum/Date 01.09.2010

Podpis/Signature

Dokument č./Document No. FIRES-PR-RT-10-2010

Príloha č./Appendix No. 55

	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	Stal cynkowana galwanicznie	Masa [kg]	Podziałka 1:1	Format A4
				Nr normy				Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	J.GROCHOWSKI		Data	20.10.05	Nazwa rysunku PSROM10x80			
Rysował	J.Grochowski			20.10.05				
Sprawdził	T.WŁODARCZYK			20.10.05				
Zatwierdził	J.KLICZEK			20.10.05				Nr zmiany
BAKS	Profesjonalne Systemy Tras Kablowych				Nr rysunku 804100			



FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01. 07. 2010

Podpis/Signature

Dokument č.
Document No. FIRES-FR-121-10-NUE

Príloha č./Appendix No. 54

TRSOM10	12	M10	40
TRSOM8	10	M8	30
NAZWA	Ø	M	L

Odchyłka wymiarów nietolerowanych

Materiał	Gatunek	Masa [kg]	Podziałka	Format A4
	Nr normy	---	4:1	Arkusz
	półfabrykat (nr normy)			Arkuszy

	Nazwisko	Podpis	Data
Projektował	G.Matuszewski		20.10.05
Rysował	G.Matuszewski		20.10.05
Sprawdził	--		20.10.05
Zatwierdził	--		20.10.05

Nazwa rysunku: TRSOM...

Nr zmiany

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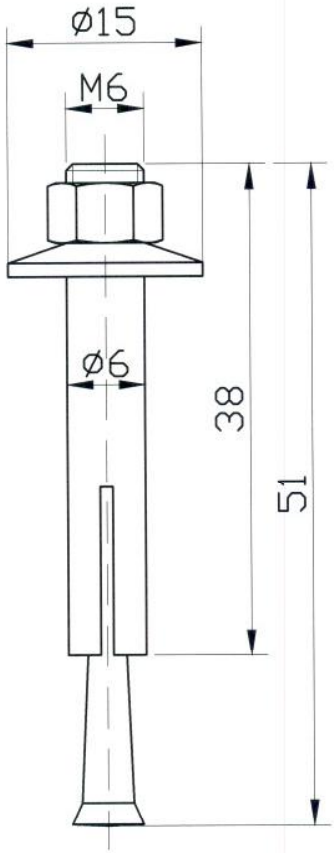
Nr rysunku: — — —



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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date
01. 09. 2010
Podpis/Signature

Dokument č. / Document No. FIRES-FP-R1-10-AWE

Príloha č./Appendix No. 55

Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	stal kwasoodporna	Masa [kg]	Podziałka	Format A4
			Nr normy		---	2:1	Arkusz
			półfabrykat (nr normy)				Arkuszy

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował				SR M6x30
Rysował	G.Matuszewski		29.01.09	
Sprawdził				Śruba rozporowa
Zatwierdził				Nr zmiany

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Nr rysunku — — —

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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 01.04.2010

Podpis/Signature

Dokument č. / Document No. FIRES-FR-121-10-ANNEX

Príloha č./Appendix No. 56

SYMBOL	L (mm)
PGM6/2	2000
PGM8/2	2000
PGM10/2	2000

Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	5,8	Masa [kg]	Podziałka	Format	A4
			Nr normy	----------			Arkusz	1
			półfabrykat (nr normy)		---		Arkuszy	1

	Nazwisko		Podpis		Data	Nazwa rysunku
Projektował		M.Stawikowski			20.10.05	Pręt gwintowany PGM...
Rysował		M.Stawikowski			20.10.05	
Sprawdził					20.10.05	
Zatwierdził					20.10.05	Nr programu maszynowego ---

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku 7