

TEST REPORT FIRES-FR-090-10-AUNE

Cable bearing system BAKS with cables business BITNER



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TEST REPORT

FIRES-FR-090-10-AUNE

Tested property: Function in fire
Test method: DIN 4102 – 12:1998-11
Date of issue: 23. 06. 2010

Name of the product: Cable bearing system BAKS
with cables business BITNER

Manufacturer: BAKS Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew,
Poland - producer of construction
ZAKLADY KABLOWE BITNER, Celina Bitner, ul. Friedleina 3/3, 30-009
Krakow, Poland – producer of cables

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

Task No.: PR-10-0188
Specimen received: 24. 05. 2010
Date of the test: 27. 05. 2010

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

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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. Grzegorz Matuszewski	BAKS Kazimierz Sielski
Mr. Marcin Tokaj	ZAKLADY KABLOWE BITNER
Mr. Tomasz Latacz	ZAKLADY KABLOWE BITNER
Mr. Bartosz Nitkiewicz	ZAKLADY KABLOWE BITNER

test directed by	Ing. Štefan Rástocký
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 ZAKLADY KABLOWE BITNER.



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 OZO, UDF and UKO1 with accessories and power and communication non-halogen cables made by ZAKLADY KABLOWE BITNER.

Cables

Used cables by test:	NHXX FE180/E90 4x1,5 RE	(21 x)
	NHXX FE180/E90 4x10 RE	(4 x)
	NHXX FE180/E90 4x50 RM	(16 x)
	NHXX FE180/E90 4x1,5 RE/1,5	(8 x)
	NHXX FE180/E90 4x16 RM/16	(2 x)
	NHXX FE180/E90 4x50 RM/25	(6 x)
	HDGsekwf FE180/E90 4x1,0 RE	(2 x)
	HDGsekwf FE180/E90 4x1,5 RE	(17 x)
	HDGsekwf FE180/E90 4x4,0 RE	(17 x)
	JE-H(St)H FE180/E90 2x2x0,8	(21 x)
	HTKSHekw FE180/E90 1x2x0,8	(23 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 to ladders in the points of allowed bending radius by steel clips besides suspension track No. 5, wherein cables were fixed to the steel sheet trays in the points of allowed bending radius by steel clips (type UDF according to the cable diameter).

Loadbearing system consisted of five sets 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. 7

Suspension was made by three consoles combined of one horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type ZK10) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PSRO M10x80) in spacing of 1500 mm. Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) were fixed at horizontal supports by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). The boxes WKE 2 and WKE 3 were fixed at bottom side of ladders.

Suspension track No. 6

Suspension was made by three consoles combined of one horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM8/1x300) with washers and nuts M8 and two hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PSRO M10x80) in spacing of 1500 mm. Trays (type KCOP 400H60/3F, steel sheet thickness 1,5 mm) were fixed at horizontal supports and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12).

Suspension track No. 12

Suspension was made by three hangers (type WKSO60) and threaded bar (type PGM6/1) with washers and nuts M6 and hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PSRO M10x80) in spacing of 1500 mm. Mesh trays (type KDS 60H60/3, steel wire Ø 4,5 mm) were fixed at hangers and jointed together by junctions (type USSO) and (type USSPWO).

Suspension track No. 5

Suspension was made by three hangers (type WFCO 400) which were fixed to ceiling by one dowels (type PSRO M10x90) 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 under booms by clips (type ZMO) and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). The boxes WKE 2 and WKE 3 were fixed at bottom side of ladders.

**Suspension tracks No. 2 and 4**

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 PGM10/1x300) with washers and nuts M10 to ceiling by dowel (type TRSO M10x40). 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). Two boxes WKE 2 were fixed at bottom side of ladders and two boxes WKE 3 were fixed on the hangers (type WFLO 500).

Suspension tracks No. 1 and 3

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 PGM10/1x300) 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 hangers and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO 400N) with screws M6 (type SGN M6x12). Two boxes WKE 2 and two boxes WKE 3 were fixed on top of the trays.

Suspension track No. 13

Suspension was made by three consoles combined of hanger (type WPTO 500) and support hangers (type PWO 400). Hangers were fixed by dowel (type PSRO M10x80) to wall. 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).

Ceiling installation

Installation was made by ceiling ledges with clips UKO1 (suspension track No. 8), holders OZMO (suspension track No. 10) and clips UDF (suspension track No. 9 and 11).

Ceiling ledges (type SDOP 800) 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 SRO M6x30) in spacing of 600 mm. Cable clips were depending on the diameter of cables. Holders OZO were fixed to ceiling by dowels (type SRO M6x30) in spacing of 600 mm and were loaded with 1,1 kg/m.

Trays were loaded with 10 kg/m and 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	22,6
standard deviation	0,5

Relative air humidity [%]

mean	48,5
standard deviation	3,0

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 O₂) 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]
27. 05. 2010	65,5	19,1

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 FE180/E90 4x1,5 RE	90 minutes no failure / interruption
2	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
3	cable HDGsekwf FE180/E90 4x1,5 RE with Firebox WKE 2	31 minutes
4	cable HDGsekwf FE180/E90 4x4,0 RE with Firebox WKE 3	15 minutes
5	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
6	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
7	2 cables HDGsekwf FE180/E90 4x1,0 RE	30 minutes
8	cable NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
9	2 cables HDGsekwf FE180/E90 4x4,0 RE	46 minutes
10	2 cables HDGsekwf FE180/E90 4x1,5 RE	47 minutes
11	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
12	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
13	cable HDGsekwf FE180/E90 4x4,0 RE with Firebox WKE 3	38 minutes
14	cable HDGsekwf FE180/E90 4x1,5 RE with Firebox WKE 2	43 minutes
15	2 cables HDGsekwf FE180/E90 4x4,0 RE	37 minutes
16	2 cables HDGsekwf FE180/E90 4x1,5 RE	50 minutes
17	2 cables NHXCH FE180/E90 4x1,5 RE/1,5	90 minutes no failure / interruption
18	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
19	cable NHXH FE180/E90 4x1,5 RE with Firebox WKE 2	83 minutes
20	2 cables HDGsekwf FE180/E90 4x4,0 RE	27 minutes



Specimen No.	Cables	Time to first failure / interruption of conductor
21	2 cables HDGsekfw FE180/E90 4x1,5 RE	32 minutes
22	2 cables NHXCH FE180/E90 4x1,5 RE/1,5	42 minutes
23	2 cables NHXCH FE180/E90 4x50 RM/25	90 minutes no failure / interruption
24	2 cables NHXH FE180/E90 4x10 RE with Firebox WKE 3	34 minutes
25	2 cables NHXH FE180/E90 4x1,5 RE with Firebox WKE 2	90 minutes no failure / interruption
26	2 cables NHXH FE180/E90 4x10 RE with Firebox WKE 3	90 minutes no failure / interruption
27	2 cables HDGsekfw FE180/E90 4x4,0 RE	34 minutes
28	2 cables HDGsekfw FE180/E90 4x1,5 RE	40 minutes
29	2 cables NHXCH FE180/E90 4x1,5 RE/1,5	90 minutes no failure / interruption
30	2 cables NHXCH FE180/E90 4x50 RM/25	90 minutes no failure / interruption
31	2 cables HDGsekfw FE180/E90 4x4,0 RE	48 minutes
32	2 cables HDGsekfw FE180/E90 4x1,5 RE	36 minutes
33	2 cables NHXH FE180/E90 4x10 RE with Firebox WKE 3	72 minutes
34	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
35	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
36	2 cables NHXH FE180/E90 4x1,5 RE with Firebox WKE 2	69 minutes
37	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
38	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
39	2 cables NHXH FE180/E90 4x1,5 RE with Firebox WKE 2	70 minutes
40	2 cables NHXH FE180/E90 4x10 RE with Firebox WKE 3	90 minutes no failure / interruption
41	2 cables NHXCH FE180/E90 4x16 RM/16	90 minutes no failure / interruption
42	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
43	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
44	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
45	5 cables HDGsekfw FE180/E90 4x4,0 RE	25 minutes
46	5 cables HDGsekfw FE180/E90 4x1,5 RE	26 minutes
47	2 cables NHXCH FE180/E90 4x1,5 RE/1,5	90 minutes no failure / interruption
48	2 cables NHXH FE180/E90 4x1,5 RE	90 minutes no failure / interruption
49	2 cables NHXCH FE180/E90 4x50 RM/25	90 minutes no failure / interruption
50	2 cables NHXH FE180/E90 4x50 RM	90 minutes no failure / interruption
52A	2 cables HTKSHekw FE180/E90 1x2x0,8	77 minutes
52B	2 cables HTKSHekw FE180/E90 1x2x0,8	79 minutes
53	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
54A, B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
55	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
56A, B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
57A	2 cables HTKSHekw FE180/E90 1x2x0,8	39 minutes
57B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
58	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
59A	2 cables HTKSHekw FE180/E90 1x2x0,8	86 minutes
59B	2 cables HTKSHekw FE180/E90 1x2x0,8	68 minutes
60	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
61A, B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
62	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
63A	2 cables HTKSHekw FE180/E90 1x2x0,8	79 minutes
63B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
64	2 cables JE-H(St)H FE180/E90 2x2x0,8	76 minutes
65A, B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
66	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
67A, B	2 cables HTKSHekw FE180/E90 1x2x0,8	90 minutes no failure / interruption
68	2 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption
69	5 cables HTKSHekw FE180/E90 1x2x0,8	58 minutes
70	5 cables JE-H(St)H FE180/E90 2x2x0,8	90 minutes no failure / interruption

The fire test was discontinued in 92nd minute at the request of test sponsor.

Specimens S1 – S50 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S70 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:

Responsible for the technical side of the test report:

Ing. Štefan Rástocký
leader of the testing laboratory



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 t [min]	Temperature [°C]											Deviation d _e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	30,0	33,2	36,9	50,1	32,8	34,9	38,7	31,9	36,1	20,0	19,1	0,0	5,9
5	537,7	532,7	452,1	546,5	576,3	556,6	603,6	567,3	546,6	576,4	19,1	-10,1	13,8
10	689,5	678,8	598,7	637,7	691,6	686,7	670,8	672,7	665,8	678,3	18,5	-6,2	15,8
15	779,6	771,0	716,6	755,2	775,6	726,0	756,1	721,5	750,2	738,6	18,3	-3,4	13,9
20	819,8	811,1	765,1	783,1	818,8	764,9	815,9	801,7	797,6	781,4	18,0	-1,9	18,5
25	856,5	850,1	804,5	821,2	838,7	785,5	844,1	823,8	828,1	814,6	17,5	-1,1	14,3
30	890,8	887,1	837,9	853,6	867,7	806,7	862,1	874,4	860,0	841,8	17,9	-0,5	15,0
35	902,1	897,3	865,0	870,1	903,0	840,7	884,4	877,7	880,0	864,8	18,3	-0,1	14,9
40	893,6	888,3	861,2	879,8	920,1	854,8	901,7	890,5	886,3	884,7	18,4	0,1	16,8
45	907,8	901,5	872,9	900,2	934,2	861,4	918,2	904,1	900,0	902,3	18,5	0,0	13,9
50	922,2	917,4	890,0	918,0	948,8	880,7	933,8	917,3	916,0	918,1	18,6	0,0	15,9
55	935,8	933,1	904,4	939,5	964,5	902,9	951,2	935,1	933,3	932,3	18,7	0,0	13,4
60	945,2	944,1	915,2	954,7	973,8	914,1	961,4	952,4	945,1	945,3	18,8	0,0	15,5
65	954,4	954,7	926,3	966,8	987,6	934,6	976,8	969,7	958,9	957,3	18,8	0,0	14,6
70	967,4	967,5	938,3	980,3	998,0	942,4	987,3	983,0	970,5	968,4	18,9	0,0	14,9
75	976,9	979,1	950,4	986,6	1006,0	957,0	1000,0	985,1	980,1	978,7	18,9	0,0	14,6
80	985,5	988,2	960,3	995,6	1016,0	968,9	1010,0	993,0	989,7	988,4	18,9	0,0	13,5
85	996,1	997,7	971,4	1002,0	1026,0	978,6	1020,0	1002,0	999,2	997,4	18,9	0,0	14,0
90	1004,0	1006,0	984,4	1012,0	1035,0	990,3	1034,0	1011,0	1009,6	1005,9	19,0	0,1	15,0
91	1007,0	1009,0	987,6	1013,0	1039,0	991,4	1036,0	1012,0	1011,9	1007,6	19,0	0,1	14,4

Tave Average temperature in the test furnace calculated from plate thermometers

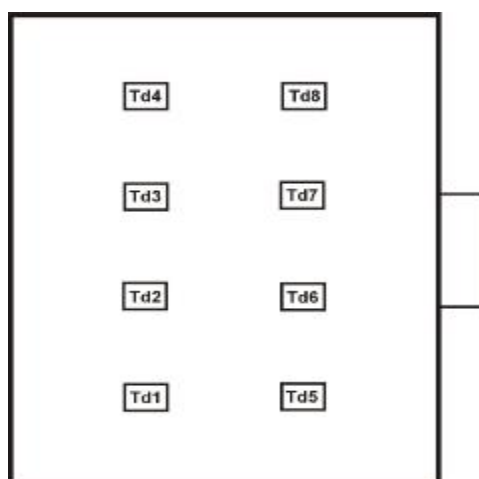
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

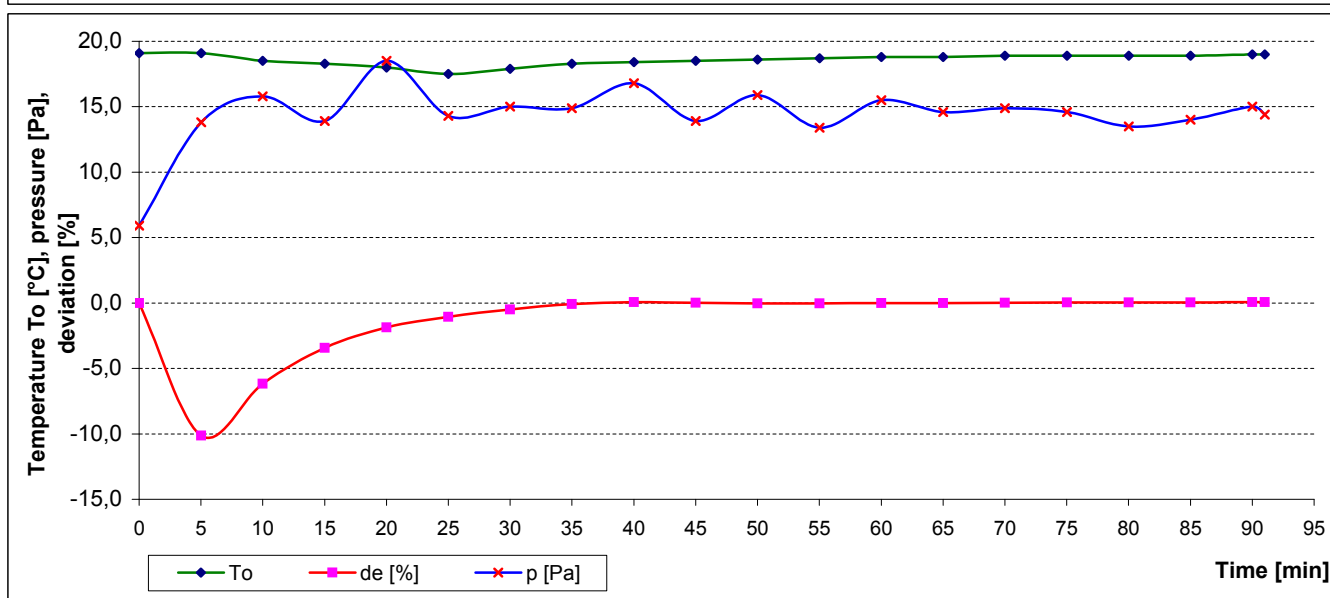
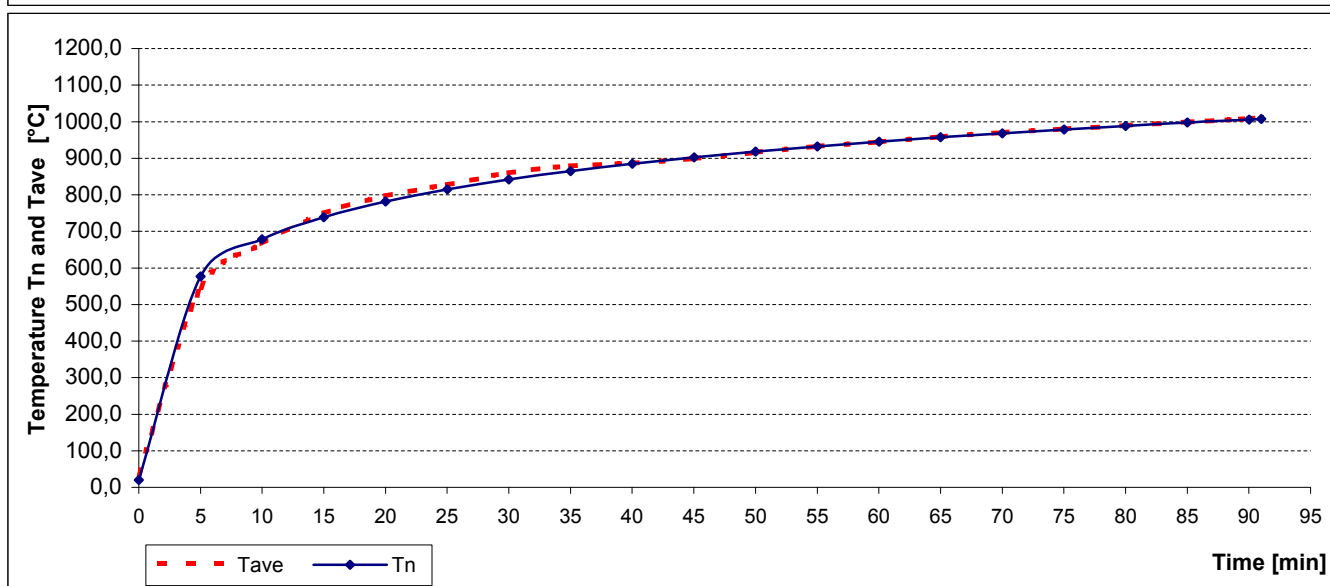
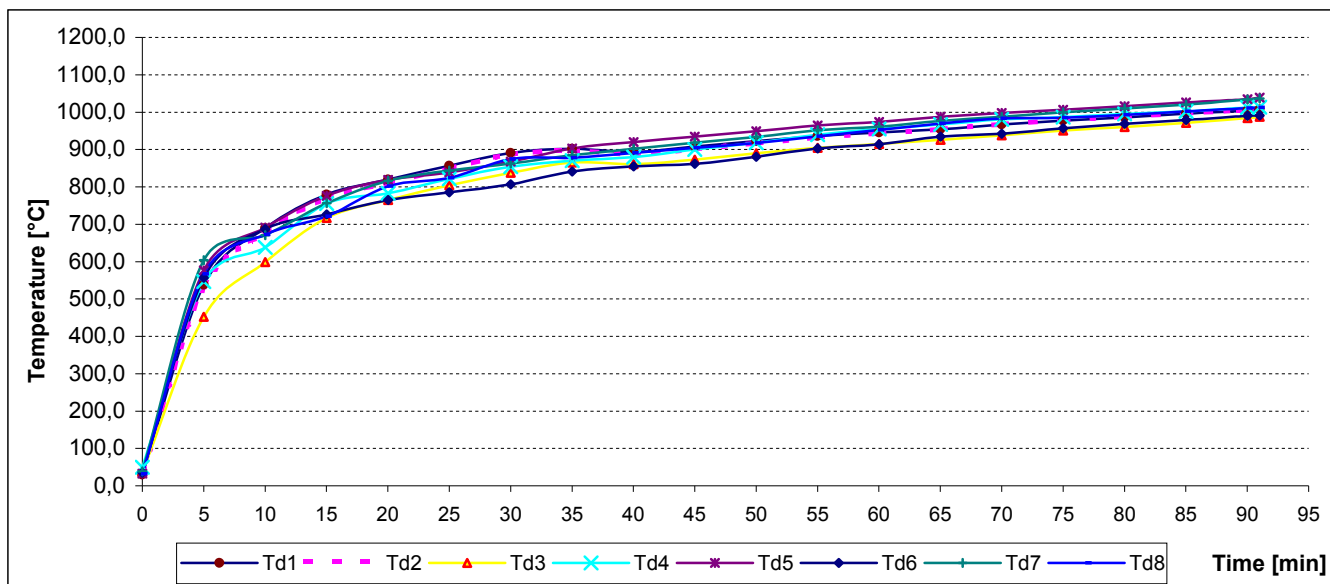
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline

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

Layout of measuring points 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	31:16
	10-L2	31:16
	11-L3	x
	12-PEN	x
S4	13-L1	x
	14-L2	15:24
	15-L3	x
	16-PEN	x
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	x
	26-L2	x
	27-L3	30:00
	28-PEN	x
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S9	33-L1	46:11
	34-L2	x
	35-L3	x
	36-PEN	x
S10	37-L1	x
	38-L2	x
	39-L3	47:22
	40-PEN	x

Specimen No.	Cables
1	2 cables NHXH FE180/E90 4x1,5 RE
2	2 cables NHXH FE180/E90 4x50 RM
3	cable HDGsekwf FE180/E90 4x1,5 RE with Firebox WKE 2
4	cable HDGsekwf FE180/E90 4x4,0 RE with Firebox WKE 3
5	2 cables NHXH FE180/E90 4x1,5 RE
6	2 cables NHXH FE180/E90 4x50 RM
7	2 cables HDGsekwf FE180/E90 4x1,0 RE
8	cable NHXH FE180/E90 4x1,5 RE
9	2 cables HDGsekwf FE180/E90 4x4,0 RE
10	2 cables HDGsekwf FE180/E90 4x1,5 RE

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

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

Measured time of tested specimens from 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	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	x
	50-L2	x
	51-L3	38:15
	52-PEN	x
S14	53-L1	43:38
	54-L2	x
	55-L3	43:38
	56-PEN	x
S15	57-L1	x
	58-L2	37:24
	59-L3	37:24
	60-PEN	x
S16	61-L1	50:07
	62-L2	x
	63-L3	x
	64-PEN	x
S17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
S18	69-L1	no failure / interruption
	70-L2	no failure / interruption
	71-L3	no failure / interruption
	72-PEN	no failure / interruption
S19	73-L1	x
	74-L2	83:43
	75-L3	x
	76-PEN	x
S20	77-L1	27:33
	78-L2	x
	79-L3	x
	80-PEN	x

Specimen No.	Cables
11	2 cables NHXH FE180/E90 4x1,5 RE
12	2 cables NHXH FE180/E90 4x50 RM
13	cable HDGsekwf FE180/E90 4x4,0 RE with Firebox WKE 3
14	cable HDGsekwf FE180/E90 4x1,5 RE with Firebox WKE 2
15	2 cables HDGsekwf FE180/E90 4x4,0 RE
16	2 cables HDGsekwf FE180/E90 4x1,5 RE
17	2 cables NHXCH FE180/E90 4x1,5 RE/1,5
18	2 cables NHXH FE180/E90 4x1,5 RE
19	cable NHXH FE180/E90 4x1,5 RE with Firebox WKE 2
20	2 cables HDGsekwf FE180/E90 4x4,0 RE

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

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

Measured time of tested specimens from S21 to S30

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	32:29
	82-L2	32:29
	83-L3	x
	84-PEN	x
S22	85-L1	42:14
	86-L2	42:14
	87-L3	x
	88-PEN	x
S23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S24	93-L1	34:56
	94-L2	x
	95-L3	x
	96-PEN	x
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	x
	106-L2	x
	107-L3	34:42
	108-PEN	x
S28	109-L1	x
	110-L2	40:36
	111-L3	40:36
	112-PEN	x
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	no failure / interruption
	118-L2	no failure / interruption
	119-L3	no failure / interruption
	120-PEN	no failure / interruption

Specimens No.	Cables
21	2 cables HDGsekwf FE180/E90 4x1,5 RE
22	2 cables NHXCH FE180/E90 4x1,5 RE/1,5
23	2 cables NHXCH FE180/E90 4x50 RM/25
24	cable NHXH FE180/E90 4x10 RE with Firebox WKE 3
25	cable NHXH FE180/E90 4x1,5 RE with Firebox WKE 2
26	cable NHXH FE180/E90 4x10 RE with Firebox WKE 3
27	2 cables HDGsekwf FE180/E90 4x4,0 RE
28	2 cables HDGsekwf FE180/E90 4x1,5 RE
29	2 cables NHXCH FE180/E90 4x1,5 RE/1,5
30	2 cables NHXCH FE180/E90 4x50 RM/25

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

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

Measured time of tested specimens from S31 to S40

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	48:04
	122-L2	x
	123-L3	48:04
	124-PEN	x
S32	125-L1	x
	126-L2	x
	127-L3	36:51
	128-PEN	x
S33	129-L1	72:20
	130-L2	x
	131-L3	x
	132-PEN	x
S34	133-L1	no failure / interruption
	134-L2	no failure / interruption
	135-L3	no failure / interruption
	136-PEN	no failure / interruption
S35	137-L1	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	x
	142-L2	69:46
	143-L3	69:46
	144-PEN	x
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S39	153-L1	70:17
	154-L2	x
	155-L3	x
	156-PEN	x
S40	157-L1	no failure / interruption
	158-L2	no failure / interruption
	159-L3	no failure / interruption
	160-PEN	no failure / interruption

Specimens No.	Cables
31	2 cables HDGsekwf FE180/E90 4x4,0 RE
32	2 cables HDGsekwf FE180/E90 4x1,5 RE
33	cable NHXH FE180/E90 4x10 RE with Firebox WKE 3
34	2 cables NHXH FE180/E90 4x1,5 RE
35	2 cables NHXH FE180/E90 4x50 RM
36	cable NHXH FE180/E90 4x1,5 RE with Firebox WKE 2
37	2 cables NHXH FE180/E90 4x1,5 RE
38	2 cables NHXH FE180/E90 4x50 RM
39	cable NHXH FE180/E90 4x1,5 RE with Firebox WKE 2
40	cable NHXH FE180/E90 4x10 RE with Firebox WKE 3

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

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

Measured time of tested specimens from S41 to S50

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S41	161-L1	no failure / interruption
	162-L2	no failure / interruption
	163-L3	no failure / interruption
	164-PEN	no failure / interruption
S42	165-L1	no failure / interruption
	166-L2	no failure / interruption
	167-L3	no failure / interruption
	168-PEN	no failure / interruption
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	25:18
	178-L2	x
	179-L3	x
	180-PEN	x
S46	181-L1	26:42
	182-L2	x
	183-L3	26:42
	184-PEN	x
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

Specimens No.	Cables
41	2 cables NHXCH FE180/E90 4x16 RM/16
42	2 cables NHXH FE180/E90 4x50 RM
43	2 cables NHXH FE180/E90 4x1,5 RE
44	2 cables NHXH FE180/E90 4x50 RM
45	5 cables HDGsekwf FE180/E90 4x4,0 RE
46	5 cables HDGsekwf FE180/E90 4x1,5 RE
47	2 cables NHXCH FE180/E90 4x1,5 RE/1,5
48	2 cables NHXH FE180/E90 4x1,5 RE
49	2 cables NHXCH FE180/E90 4x50 RM/25
50	2 cables NHXH FE180/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 S52 to S61

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	77:55
	210-PEN	x
S52B	211-L	79:12
	212-PEN	x
S53	213-L	no failure / interruption
	214-PEN	no failure / interruption
	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
S55	221-L	no failure / interruption
	222-PEN	no failure / interruption
	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	39:12
	230-PEN	x
S57B	231-L	no failure / interruption
	232-PEN	no failure / interruption
S58	233-L	no failure / interruption
	234-PEN	no failure / interruption
	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59A	237-L	86:53
	238-PEN	x
S59B	239-L	68:30
	240-PEN	x
S60	241-L	no failure / interruption
	242-PEN	no failure / interruption
	243-L	no failure / interruption
	244-PEN	no failure / interruption
S61A	245-L	no failure / interruption
	246-PEN	no failure / interruption
S61B	247-L	no failure / interruption
	248-PEN	no failure / interruption

Specimens No.	Cables
52	cable HTKSHekw FE180/E90 1x2x0,8
53	2 cables JE-H(St)H FE180/E90 2x2x0,8
54	cable HTKSHekw FE180/E90 1x2x0,8
55	2 cables JE-H(St)H FE180/E90 2x2x0,8
56	cable HTKSHekw FE180/E90 1x2x0,8
57	cable HTKSHekw FE180/E90 1x2x0,8
58	2 cables JE-H(St)H FE180/E90 2x2x0,8
59	cable HTKSHekw FE180/E90 1x2x0,8
60	2 cables JE-H(St)H FE180/E90 2x2x0,8
61	cable HTKSHekw FE180/E90 1x2x0,8

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 diodes 3V / 0,03W.
Circuit breakers with rating 3 A were used.

Measured time of tested specimens from S62 to S70

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S62	249-L	no failure / interruption
	250-PEN	no failure / interruption
	251-L	no failure / interruption
	252-PEN	no failure / interruption
S63A	253-L	79:12
	254-PEN	x
S63B	255-L	no failure / interruption
	256-PEN	no failure / interruption
S64	257-L	76:17
	258-PEN	x
	259-L	x
	260-PEN	x
S65A	261-L	no failure / interruption
	262-PEN	no failure / interruption
S65B	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66	265-L	no failure / interruption
	266-PEN	no failure / interruption
	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	no failure / interruption
	270-PEN	no failure / interruption
S67B	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68	273-L	no failure / interruption
	274-PEN	no failure / interruption
	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69	277-L	x
	278-PEN	x
	279-L	58:18
	280-PEN	x
S70	281-L	no failure / interruption
	282-PEN	no failure / interruption
	283-L	no failure / interruption
	284-PEN	no failure / interruption

Specimens No.	Cables
62	2 cables JE-H(St)H FE180/E90 2x2x0,8
63	cable HTKSHekw FE180/E90 1x2x0,8
64	2 cables JE-H(St)H FE180/E90 2x2x0,8
65	cable HTKSHekw FE180/E90 1x2x0,8
66	2 cables JE-H(St)H FE180/E90 2x2x0,8
67	cable HTKSHekw FE180/E90 1x2x0,8
68	2 cables JE-H(St)H FE180/E90 2x2x0,8
69	5 cables HTKSHekw FE180/E90 1x2x0,8
70	5 cables JE-H(St)H FE180/E90 2x2x0,8

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 diodes 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



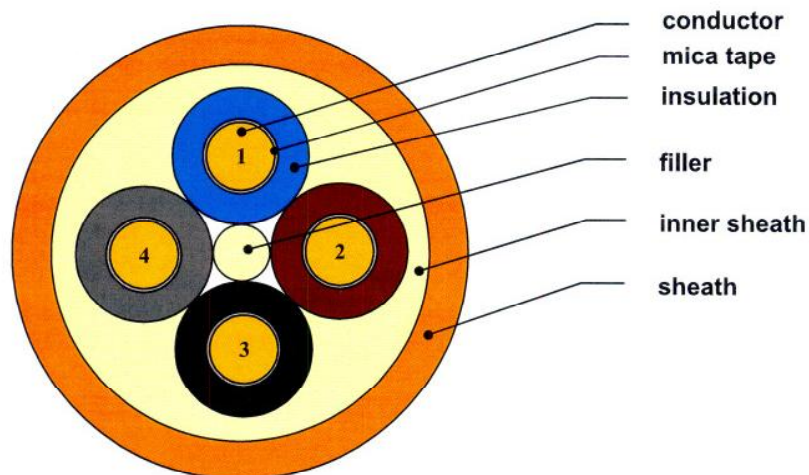
Photo taken after the test – left side



Photo taken after the test

NHXXH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

 FIRES S.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 24.05.2010
	 Podpis/Signature
	Dokument č. Document No. FIRES-FR-090-10-MWE
Príloha č./Appendix No. 12	

NHXX E90

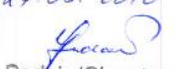
CHARACTERISTICS

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

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

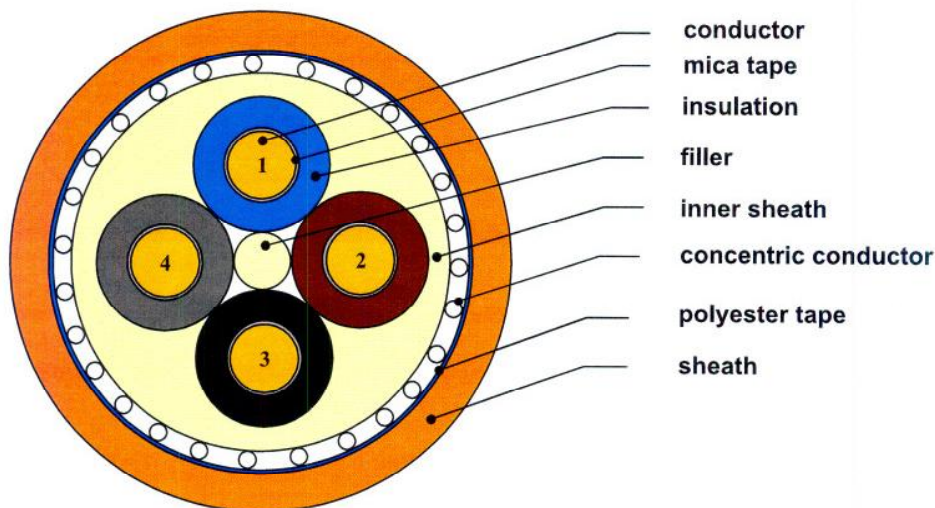
Operating temperature range
during operation -25°C up to +90°C
during installation -5°C up to +50°C
Minimum bending radius
15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50226:2006, IEC 60332-3
Reference standards DIN VDE 0266

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	Dokument č. Document No. FIRES-PR-CRO-10-PAVE
Príloha č./Appendix No. 13	

NHXCH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

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	Dokument č. Document No. FIRES-FR-090-10-PWE
Príloha č./Appendix No. 13	

NHXCH E90

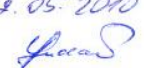
CHARACTERISTICS

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

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

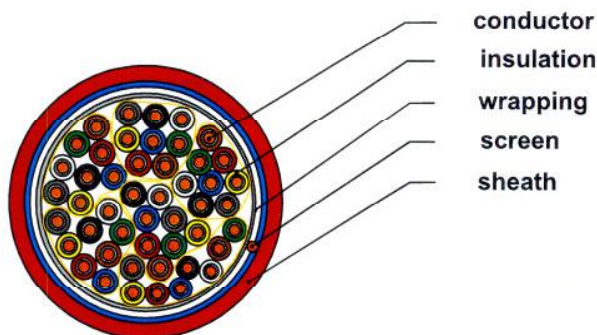
Operating temperature range
during operation -25°C up to +90°C
during installation -5°C up to +50°C
Minimum bending radius
15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50226:2006, IEC 60332-3
Reference standards DIN VDE 0266

 FIRES S.T.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 22. 05. 2010
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Dokument č. Document No. FIRES-FR-090-10-ANWE	
Príloha č./Appendix No. 15	

JE-H(St)H MIKA E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission of signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.

Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0207-23

wrapping - polyester and glass-fibre tape

screen - static screen of plastic coated metal foil with a solid, tinned drain wire

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0207-5

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	<i>[Signature]</i> Podpis/Signature
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Príloha č./Appendix No. <i>16</i>	

JE-H(St)H MIKA E90

CHARACTERISTICS

Conductor diameter	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x 80 x 2 x	0,8
1 x 2 x 80 x 2 x	1,0

Operating voltage 225V
Voltage test
core/core 500 V, 50 Hz
core/screen 2000 V, 50 Hz
Insulation resistivity at 90°C,
minimum 10^{12}

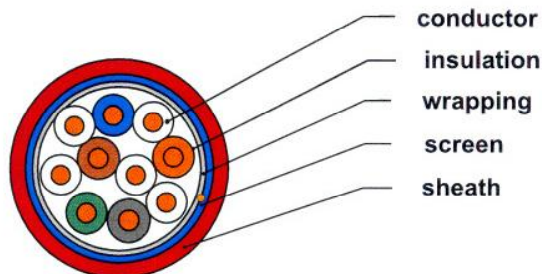
Operating temperature range
during operation -25°C up to +80°C
during installation -5°C up to +50°C
Minimum bending radius
8 x D single core
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50226:2006, IEC 60332-3
Reference standards DIN VDE 0815

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Dokument č. / Document No. <i>FIRES-FR-090-10-ANNE</i>	
Príloha č./Appendix No. <i>14</i>	

HTKSH(ekw) FE180/E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.

Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

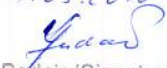
conductor - bare copper, solid acc. to PN-EN 60228:2005

insulation - mica tape and halogen free forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with a solid, tinned drain wire

sheath - flame resistant, halogen free polymer compound

 FIRES S.T.O. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 24.05.2010
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	Dokument č. Document No. FIRES-FR-090-10-ANĚ
Príloha č./Appendix No. 78	

HTKSH(ekw) FE180/E90

CHARACTERISTICS

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

Operating voltage 225V
Voltage test
core/core 1500 V, 50 Hz
core/screen 1500 V, 50 Hz

Insulation resistivity at 90°C,
minimum 10^{11}

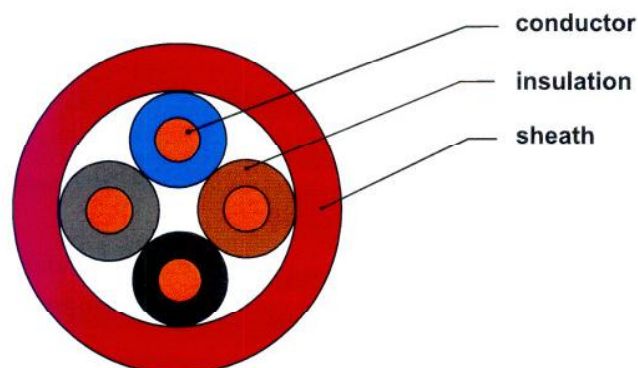
Operating temperature range
during operation -25°C up to +70°C
during installation -5°C up to +50°C
Minimum bending radius 10 x D single core
D = outer diameter

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

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Príloha č. / Appendix No. 19	

HDGs FE180/E90

FIRE RESISTANT HALOGEN FREE POWER CABLE



APPLICATIONS

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228:2005

insulation - cross-linked halogen free ceramic forming polymer compound

sheath - flame resistant, halogen free polymer compound

	Dátum/Date <i>24.05.2010</i>
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Príloha č./Appendix No. <i>20</i>	

HDGs FE180/E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 4
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V

Voltage test
core/core 2000 V, 50 Hz
core/screen 2000 V, 50 Hz

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -25°C up to +70°C
during installation -10°C up to +50°C

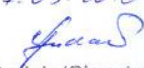
Minimum bending radius
10 x D single core
D = outer diameter

Cable combustibility

Fire resistance E90

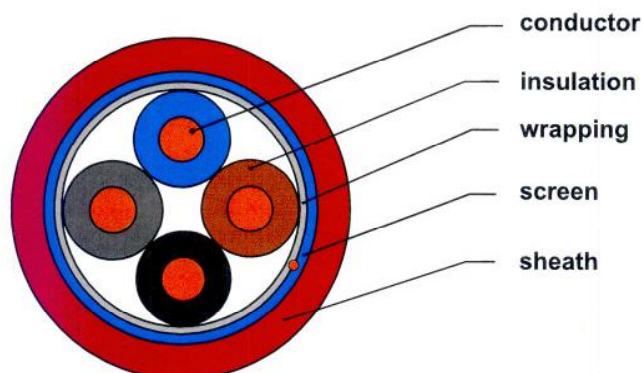
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3

Reference standards ZN-CB-03-2002

 FIRES S.T.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 24. 05. 2010
	 Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-040-10-AME</i>
Príloha č./Appendix No. <i>21</i>	

HDGsekwf FE180/E90

FIRE RESISTANT HALOGEN FREE POWER CABLE



APPLICATIONS

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

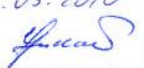
conductor - bare copper, solid acc. to PN-EN 60228:2005

insulation - cross-linked halogen free ceramic forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with tinned copper drain wire

sheath - flame resistant, halogen free polymer compound

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Príloha č./Appendix No. 22	

HDGsekwf FE180/E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 4
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V

Voltage test
core/core 2000 V, 50 Hz
core/screen 2000 V, 50 Hz

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range

during operation -25°C up to +70°C
during installation -10°C up to +50°C

Minimum bending radius
10 x D single core
D = outer diameter

Cable combustibility

Fire resistance E90

Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3

Reference standards ZN-CB-03-2002

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Príloha č./Appendix No. <i>23</i>	

Badanie trasy kablowej BAKS - BITNER - SPELSBERG
Badanie w FIRES Słowacja Data 27.05.2010

Nr	Nr FIRES	Czas	Symbol kabla	Pozycja	Konstrukcja mocowania, odległość, obciążenie
1	40		NHXX FE180/ E90 4x10 RE	WKE 3	1 Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM8/..., do betonu za pomocą tulei stalowej TRSO M10x40
2	39		NHXX FE180/ E90 4x1.5 RE	WKE2	
3	38		NHXX FE180/ E90 4x50 RM		
4			NHXX FE180/ E90 4x50 RM		
5	37		NHXX FE180/ E90 4x1,5 RE		
6			NHXX FE180/ E90 4x1,5 RE		
7	66		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
8			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
9	65B		HTKSHekw FE180/90 1x2x0,8		
10	65A		HTKSHekw FE180/90 1x2x0,8		
11	36		NHXX FE180/ E90 4x1.5 RE	WKE2	2 Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., do betonu za pomocą tulei stalowej TRSO M10x 40
12	35		NHXX FE180/ E90 4x50 RM		
13			NHXX FE180/ E90 4x50 RM		
14	34		NHXX FE180/ E90 4x1,5 RE		
15			NHXX FE180/ E90 4x1,5 RE		
16	64		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
17			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
18	63A		HTKSHekw FE180/90 1x2x0,8		
19	63B		HTKSHekw FE180/90 1x2x0,8		
20	33		NHXX FE180/ E90 4x10 RE	WKE 3	
21	30		NHXX FE180/ E90 4x50/25 RM		3 Korytko kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., do betonu za pomocą tulei stalowej TRSO M10x 40
22			NHXX FE180/ E90 4x50/25 RM		
23	29		NHXX FE180/E90 4x1,5/1,5 RE		
24			NHXX FE180/E90 4x1,5/1,5 RE		
25	28		HDGsekfw FE180/ E90 4x1,5 RE		
26			HDGsekfw FE180/ E90 4x1,5 RE		
27	27		HDGsekfw FE180/ E90 4x4,0 RE		
28			HDGsekfw FE180/ E90 4x4,0 RE		
29	25		NHXX FE180/ E90 4x1.5 RE	WKE2	
30	26		NHXX FE180/ E90 4x10 RE	WKE 3	
31	24		NHXX FE180/ E90 4x10 RE	WKE 3	4 Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFLO 500, Wysięgnik WFLO400 , pręt gwintowany PGM10/..., do betonu za pomocą tulei stalowej TRSO M10x 40
32	23		NHXX FE180/ E90 4x50/25 RM		
33			NHXX FE180/ E90 4x50/25 RM		
34	22		NHXX FE180/E90 4x1,5/1,5 RE		
35			NHXX FE180/E90 4x1,5/1,5 RE		
36	21		HDGsekfw FE180/ E90 4x1,5 RE		
37			HDGsekfw FE180/ E90 4x1,5 RE		
38	20		HDGsekfw FE180/ E90 4x4,0 RE		
39			HDGsekfw FE180/ E90 4x4,0 RE		
40	19		NHXX FE180/ E90 4x1.5 RE	WKE2	
41	14		HDGsekfw FE180/ E90 4x1,5 RE	WKE 2	5 Drabinka kablowa DGOP 400H60/... B-400 1.5 m /20kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WFCO400 , pręt gwintowany PGM8/..., do betonu za pomocą tulei stalowej TRSO M8x 30
42	13		HDGsekfw FE180/ E90 4x4 RE	WKE 3	
43	12		NHXX FE180/ E90 4x50 RM		
44			NHXX FE180/ E90 4x50 RM		
45	11		NHXX FE180/ E90 4x1,5 RE		
46			NHXX FE180/ E90 4x1,5 RE		
47	58		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
48			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
49	57B		HTKSHekw FE180/90 1x2x0,8		
50	57A		HTKSHekw FE180/90 1x2x0,8		

FIRES s.r.o.
POŽIARNA ODOLNOST
FIRE RESISTANCE

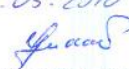
Dátum/Date
27.05.2010

Podpis/Signature
[Signature]

Dokument č. *FIRES-FR-090-10-NIVE*
Document No.

Príloha č./Appendix No. *25*

Nr	Nr FIRES	Czas	Symbol kabla	Pozycja	Konstrukcja mocowania, odległość, obciążenie
51	6		NHXX FE180/ E90 4x50 RM	6	Korytka kablowe KCOP 400H60/... B-400 1.5 m /10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM8/..., ceownik CWOP 40H40/05, do konstrukcji stalowej za pomocą uchwytów ZK8
52			NHXX FE180/ E90 4x50 RM		
53	5		NHXX FE180/ E90 4x1,5 RE		
54			NHXX FE180/ E90 4x1,5 RE		
55	55		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
56			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
57	54B		HTKSHekw FE180/90 1x2x0,8		
58	54A		HTKSHekw FE180/90 1x2x0,8		
59	4		HDGsekWF FE180/ E90 4x4,0 RE	7	. Drabinka kablowa DGOP 400H60/... B-400/ 1.5 m / 10kg/m / grubość blachy 1,5 mm Mocowanie : pręt gwintowany PGM10/..., ceownik CWOP 40H40/05, do konstrukcji stalowej za pomocą uchwytów ZK8
60	3		HDGsekWF FE180/ E90 4x1,5 RE		
61	2		NHXX FE180/ E90 4x50 RM		
62			NHXX FE180/ E90 4x50 RM		
63	1		NHXX FE180/ E90 4x1,5 RE		
64			NHXX FE180/ E90 4x1,5 RE		
65	53		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
66			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
67	52B		HTKSHekw FE180/90 1x2x0,8		
68	52A		HTKSHekw FE180/90 1x2x0,8		
69	50		NHXX FE180/ E90 4x50 RM	8	Uchwyt kablowy UKO1 + Szczepel SDOP 800 Mocowanie do betonu co 600 mm za pomocą śruby rozporowej SRO M6x30
70			NHXX FE180/ E90 4x50 RM		
71	49		NHXXCH FE180/ E90 4x50/25 RM		
72			NHXXCH FE180/ E90 4x50/25 RM		
73	48		NHXX FE180/ E90 4x1,5 RE		
74			NHXX FE180/ E90 4x1,5 RE		
75	47		NHXXCH FE180/E90 4x1,5/1,5 RE		
76			NHXXCH FE180/E90 4x1,5/1,5 RE		
77	70-71		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
78			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
79	69		HTKSHekw FE180/90 1x2x0,8		
80			HTKSHekw FE180/90 1x2x0,8		
81	46		HDGsekWF FE180/ E90 4x1,5 RE		
82			HDGsekWF FE180/ E90 4x1,5 RE		
83	45		HDGsekWF FE180/ E90 4x4,0 RE		
84			HDGsekWF FE180/ E90 4x4,0 RE		
85	42		NHXX FE180/ E90 4x50 RM	9	Uchwyty kablowe UDF. Mocowanie do betonu co 600mm za pomocą kołka SRO M6x30
86			NHXX FE180/ E90 4x50 RM		
87	41		NHXXCH FE180/ E90 4x16/16 RM		
88			NHXXCH FE180/ E90 4x16/16 RM		
89	75		HDGs FE180/ E90 4x1,0 RE	10	Obejma OZMO. Obciążenie 1,1 kg/m.Mocowanie do betonu co 0.6m za pomocą kołków rozporowych SRO M6x 30
90	74		HDGs FE180/ E90 4x1,0 RE		
91	73		HDGs FE180/ E90 4x1,0 RE		
92	72		HDGs FE180/ E90 4x1,0 RE		
93	62		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
94			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
95	61B		HTKSHekw FE180/90 1x2x0,8		
96	61A		HTKSHekw FE180/90 1x2x0,8		
97	32		HDGsekWF FE180/ E90 4x1,5 RE		
98			HDGsekWF FE180/ E90 4x1,5 RE		
99	31		HDGsekWF FE180/ E90 4x4,0 RE		
100			HDGsekWF FE180/ E90 4x4,0 RE		

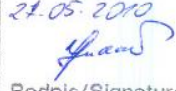
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	Podpis/Signature 
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Příloha č./Appendix No. 26	

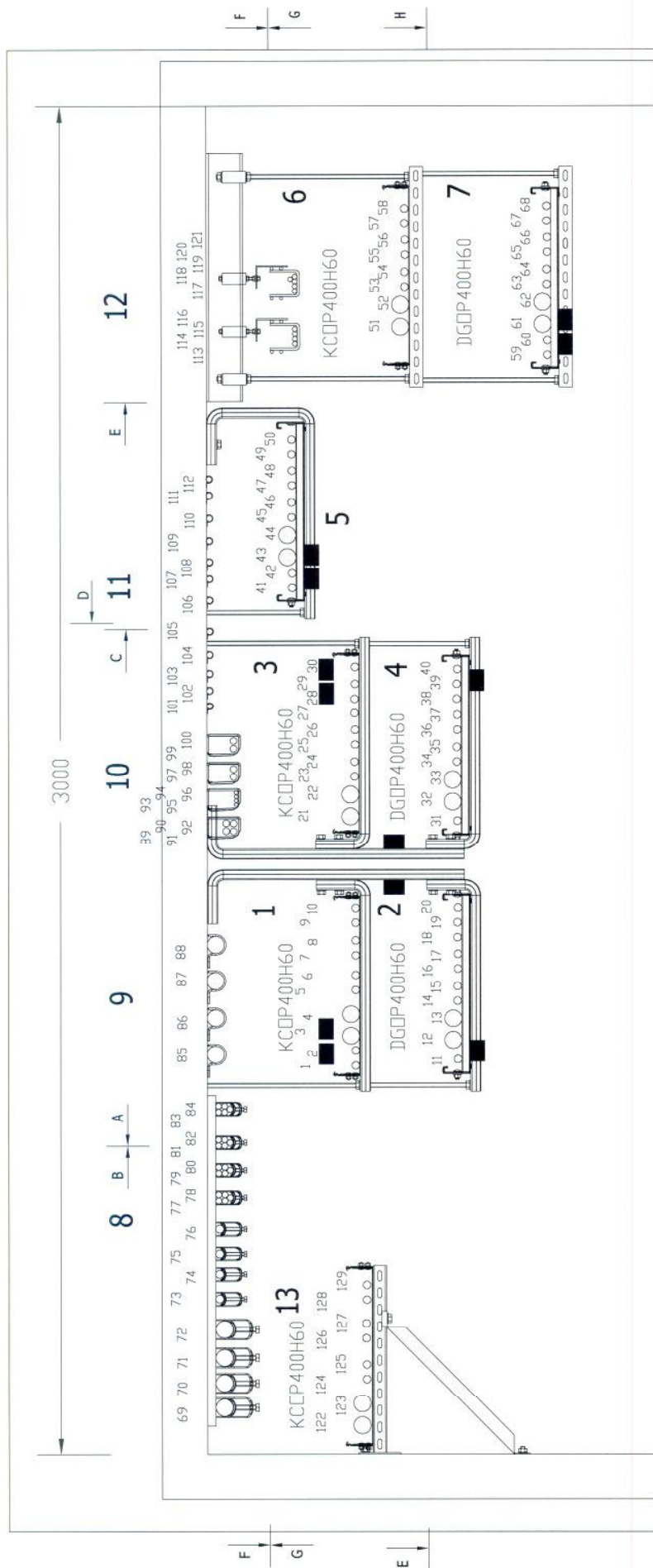
Nr	Nr FIRES	Czas	Symbol kabla	Pozycja	Konstrukcja mocowania, odległość, obciążenie
101	18		NHXX FE180/ E90 4x1,5 RE	11	Uchwyty kablowe UDF. Mocowanie do betonu co 600mm za pomocą kołka SRO M6x30
102			NHXX FE180/ E90 4x1,5 RE		
103	17		NHXCH FE180/E90 4x1,5/1,5 RE		
104			NHXCH FE180/E90 4x1,5/1,5 RE		
105	60		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
106			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
107	59B		HTKSHekw FE180/90 1x2x0,8		
108	59A		HTKSHekw FE180/90 1x2x0,8		
109	16		HDGsekWF FE180/ E90 4x1,5 RE		
110			HDGsekWF FE180/ E90 4x1,5 RE		
111	15		HDGsekWF FE180/ E90 4x4,0 RE		
112			HDGsekWF FE180/ E90 4x4,0 RE		
113	10		HDGsekWF FE180/ E90 4x1,5 RE	12	Korytka siatkowe KDS 60H60/... B-60/ 1.5 m / 1,5kg/m / średnica pręta 4,5 mm Mocowanie : pręt gwintowany PGM6/..., do konstrukcji stalowej za pomocą uchwytów ZK8
114			HDGsekWF FE180/ E90 4x1,5 RE		
115	9		HDGsekWF FE180/ E90 4x4,0 RE		
116			HDGsekWF FE180/ E90 4x4,0 RE		
117	8		NHXX FE180/ E90 4x1,5 RE		
118	56B		HTKSHekw FE180/90 1x2x0,8		
119	56A		HTKSHekw FE180/90 1x2x0,8		
120	7		HDGsekWF FE180/ E90 4x1,0 RE		
121			HDGsekWF FE180/ E90 4x1,0 RE		
122	44		NHXX FE180/ E90 4x50 RM	13	Korytka kablowe KCOP 400H60/... B-400 1.5 m / 10kg/m / grubość blachy 1,5 mm Mocowanie : Wysięgnik WPTO400 + podpórka wysięgnika PWO 400, do betonu za pomocą śruby rozporowej PSRO M10x80
123			NHXX FE180/ E90 4x50 RM		
124	43		NHXX FE180/ E90 4x1,5 RE		
125			NHXX FE180/ E90 4x1,5 RE		
126	68		JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
127			JE-H(St)H.. RE FE180/ E90 2x2x 0.8		
128	67B		HTKSHekw FE180/90 1x2x0,8		
129	67A		HTKSHekw FE180/90 1x2x0,8		

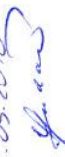
Zestawienie kabli BITNER:

Lp.	Symbol kabla	Średnica [mm]	Ciężar kabla [kg/m]
	NHXX FE180/E90 4x1,5RE	14,8	0,32
	NHXCH FE180/E90 4x1,5RE/1,5	16,2	0,35
	NHXX FE180/E90 4x10RE	20,0	0,80
	NHXCH FE180/E90 4x16RM/16	26,4	1,35
	NHXX FE180/E90 4x50RM	36,2	3,00
	NHXCH FE180/E90 4x50RM/25	38,3	3,30
	JE-H(St)H FE180/E90 2x2x0,8	10,0	0,15
	HTKSHekw 1x2x0,8	7,5	0,08
	HDGsekWF FE180/E90 4x1,5 RE	10,5	0,15
	HDGsekWF FE180/E90 4x4,0 RE	13,0	0,25
	HDGsekWF FE180/E90 4x1,0 RE	9,5	0,11
	HDGs FE180/E90 4x1,0 RE	8,5	0,10

Zestawienie puszek SPELZBERG: WKE 2, WKE 3

 FIRES S.r.o. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 21.05.2010  Podpis/Signature
	Dokument č. Document No. FIRES-FR-090-10-ANNE
Příloha č./Appendix No. 24	

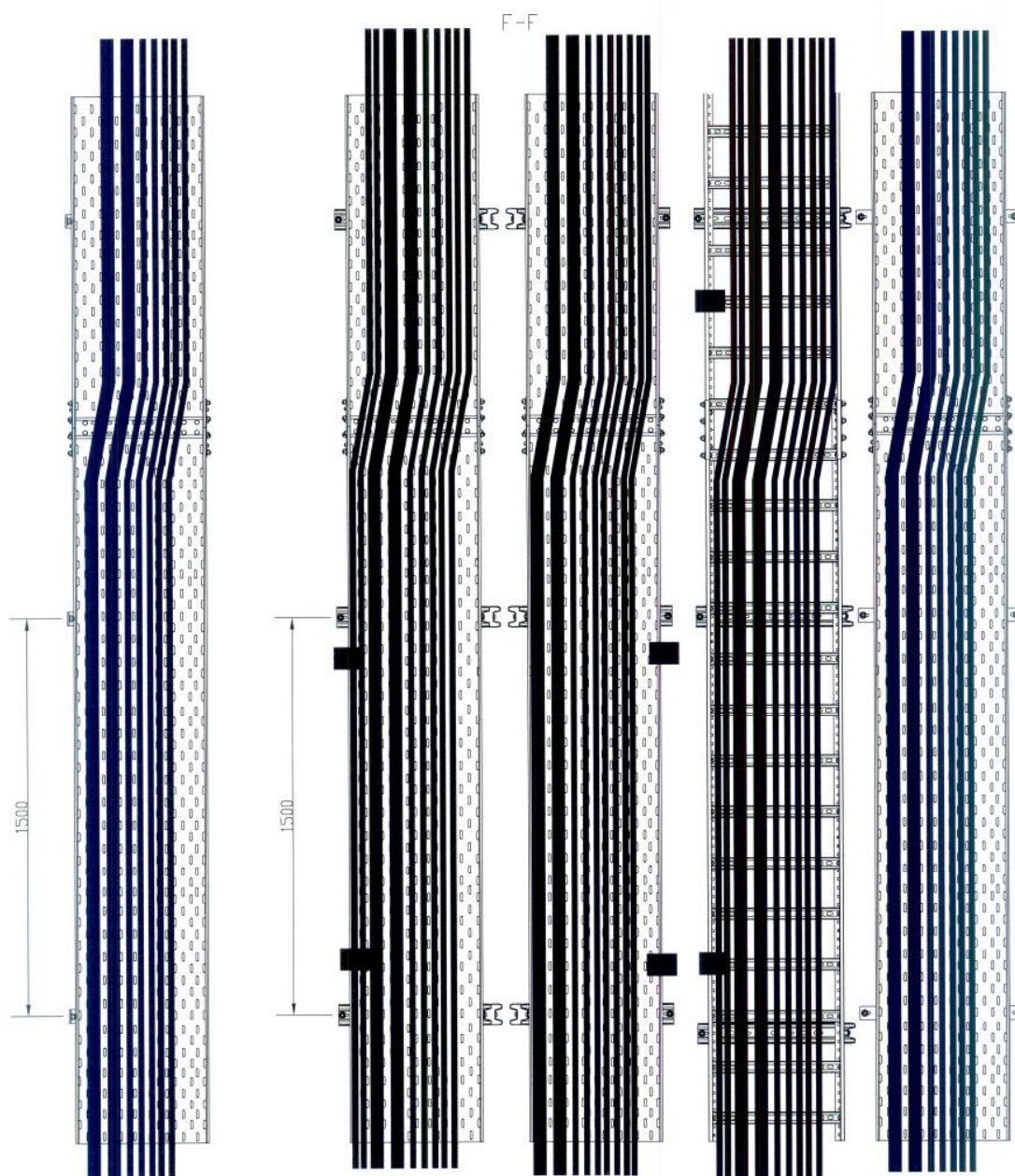


 FIRES S.T.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 24.05.2012
	Podpis/Signature 
Dokument č. FIRES-FR-090-10-AWE Document No.	
Príloha č./Appendix No. 28	

BAKS-BITNERL-SPELSBERG

FIRES

27.05. 2010rok



BAKS-BITNERL-SPELSBERG
FIRES
27.05. 2010rok

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	Podpis/Signature 
Dokument č. Document No. <i>FIRES-FR-090-10-MWE</i>	
Príloha č./Appendix No. <i>29</i>	

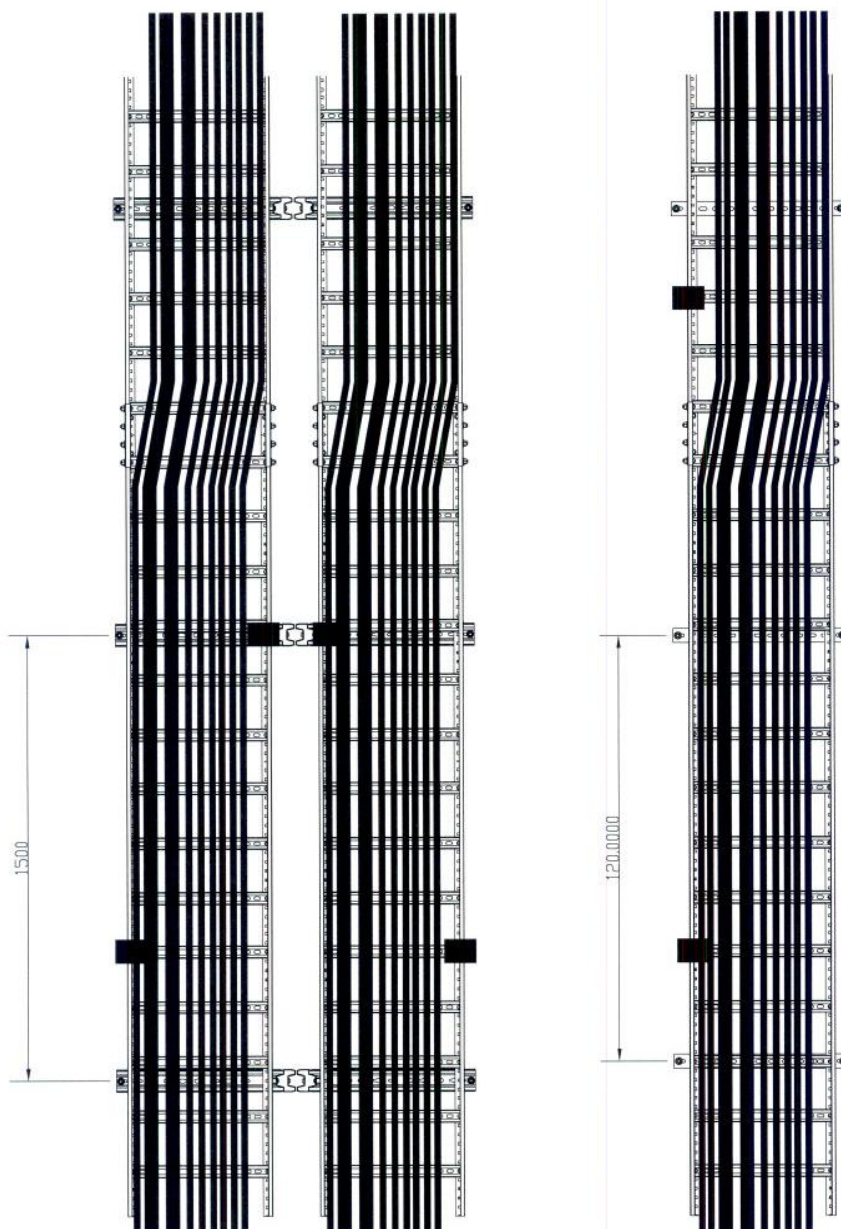
G-G



BAKS-BITNERL-SPELSBERG
FIRES
27.05. 2010rok

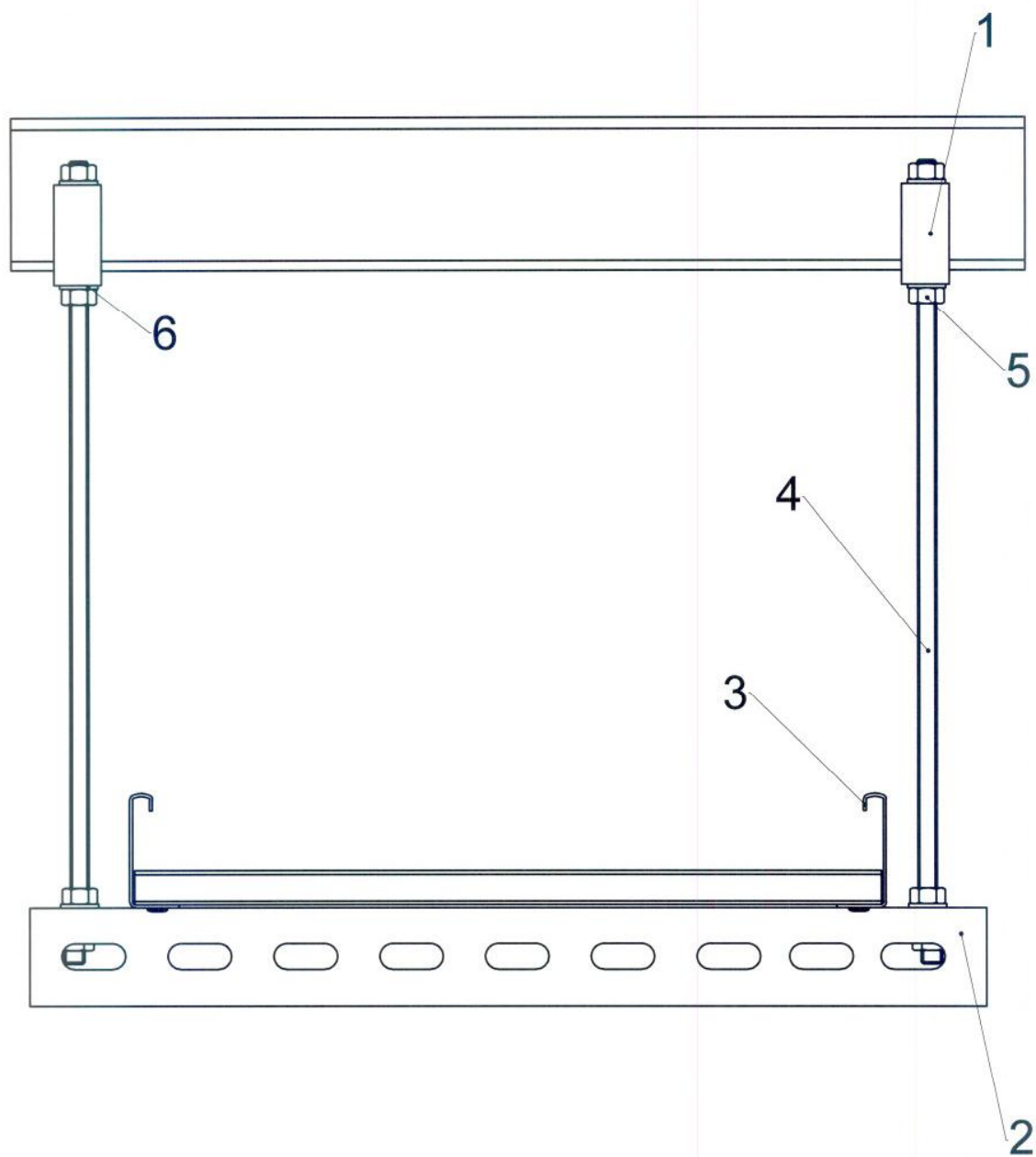
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	<i>[Signature]</i> Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-090-10-ADNE</i>
Príloha č./Appendix No. <i>30</i>	

H-H



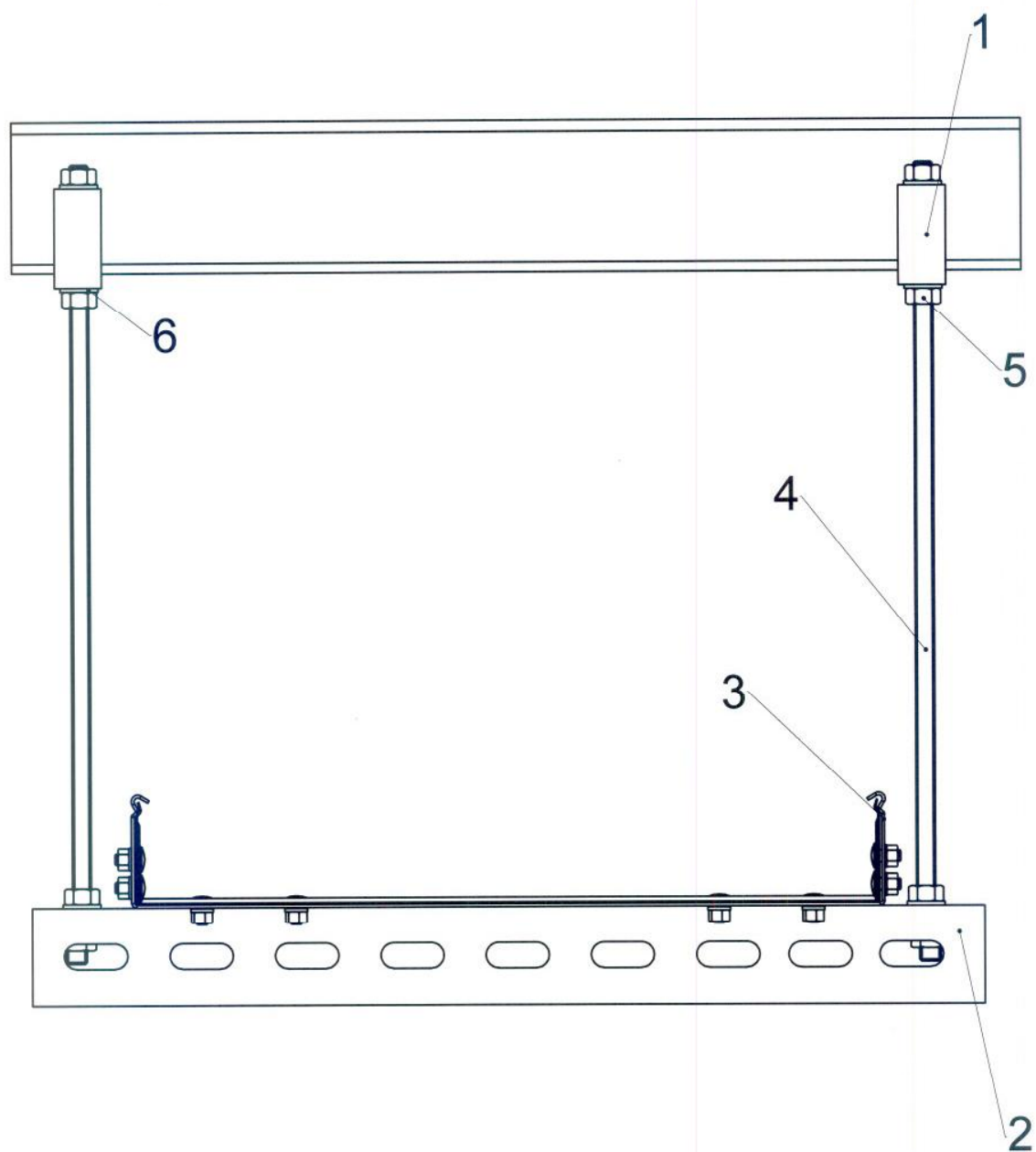
BAKS-BITNERL-SPELSBERG
FIRES
27.05. 2010rok

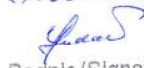
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Príloha č./Appendix No. <i>31</i>	



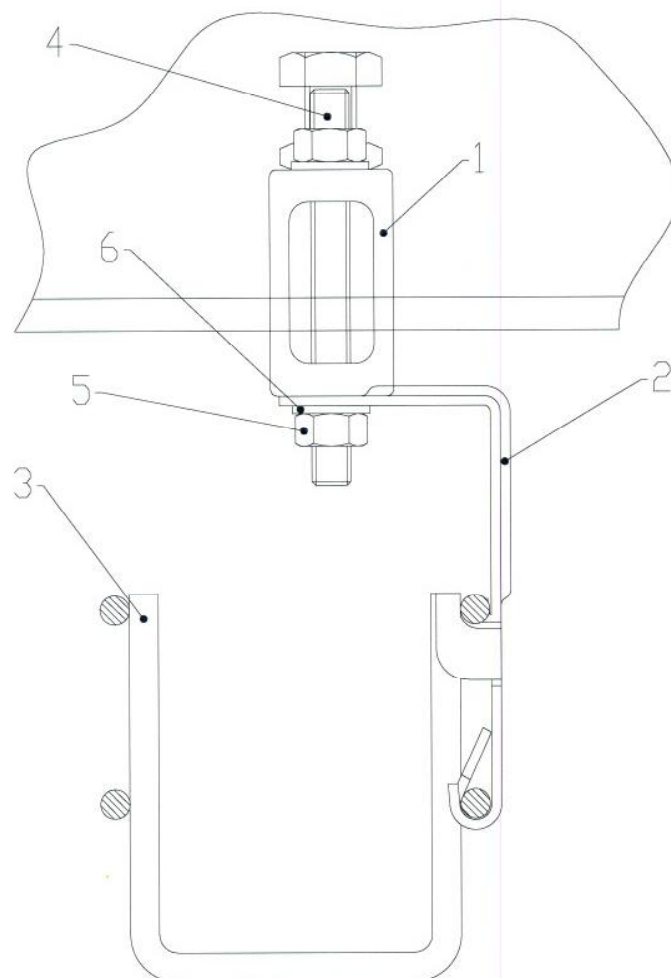
	Dátum/Date	24.05.2010
	Podpis/Signature	<i>[Signature]</i>
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6	podkladka	PP10	8
5	nakrętka	NSM10	8
4	pręt gwintowany	PGM10	2
3	drabikna	DGOP400H60/3	1
2	ceownik wzmacniony	CWOP40H40	1
1	zacisk	ZK10	2
LP.	NAZWA	SYMBOL	szt.



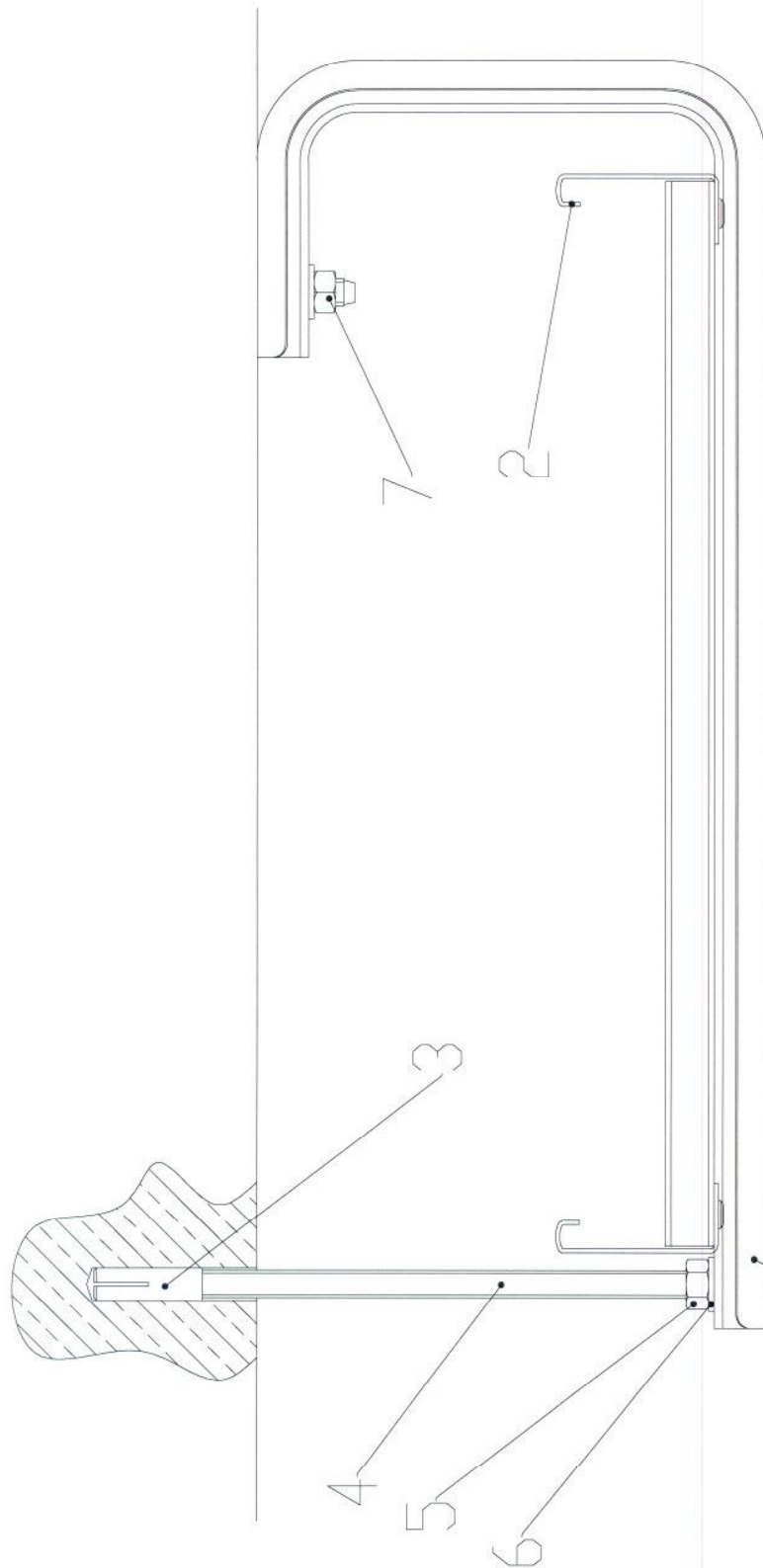
 FIRES S.T.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 24.05.2010
	Podpis/Signature 
Dokument č. / Document No. <i>FIRES-FR-090-10-NNE</i>	
Príloha č./Appendix No. <i>33</i>	

6	podkladka	PP10	8
5	nakrętka	NSM10	8
4	pręt gwintowany	PGM10	2
3	korytko	KCOP400H60/3	1
2	ceownik wzmocniony	CWOP40H40	1
1	zacisk	ZK10	2
LP.	NAZWA	SYMBOL	szt.



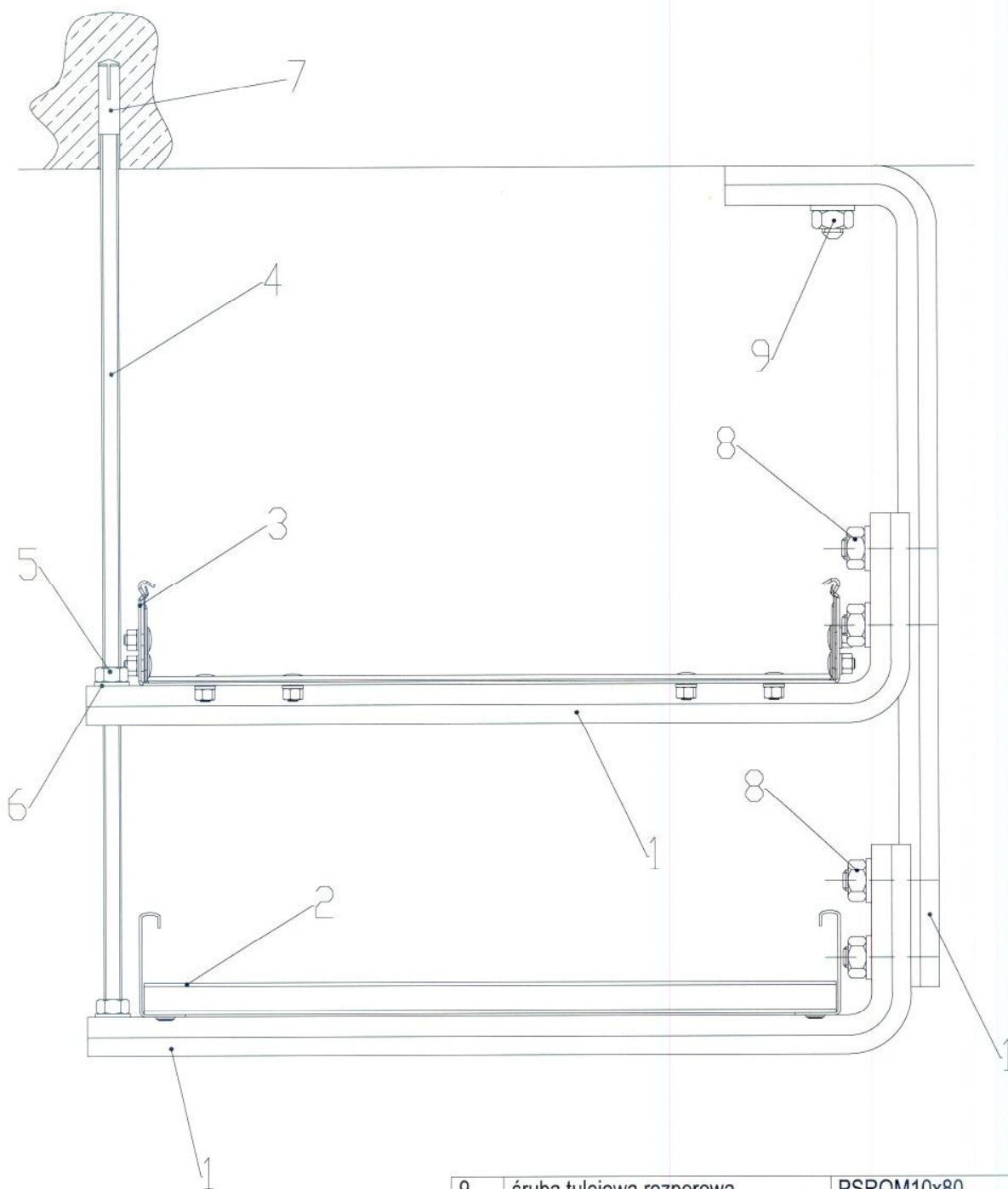
6	podkładka	PP6	2
5	nakrętka	NSM6	2
4	pręt gwintowany	PGM6	1
3	korytko siatkowe	KDSO60H60/3	1
2	wieszak korytko siatkowego	WKS060	1
1	zacisk	ZK8	1
LP.	NAZWA	SYMBOL	szt.

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Príloha č./Appendix No. 34	



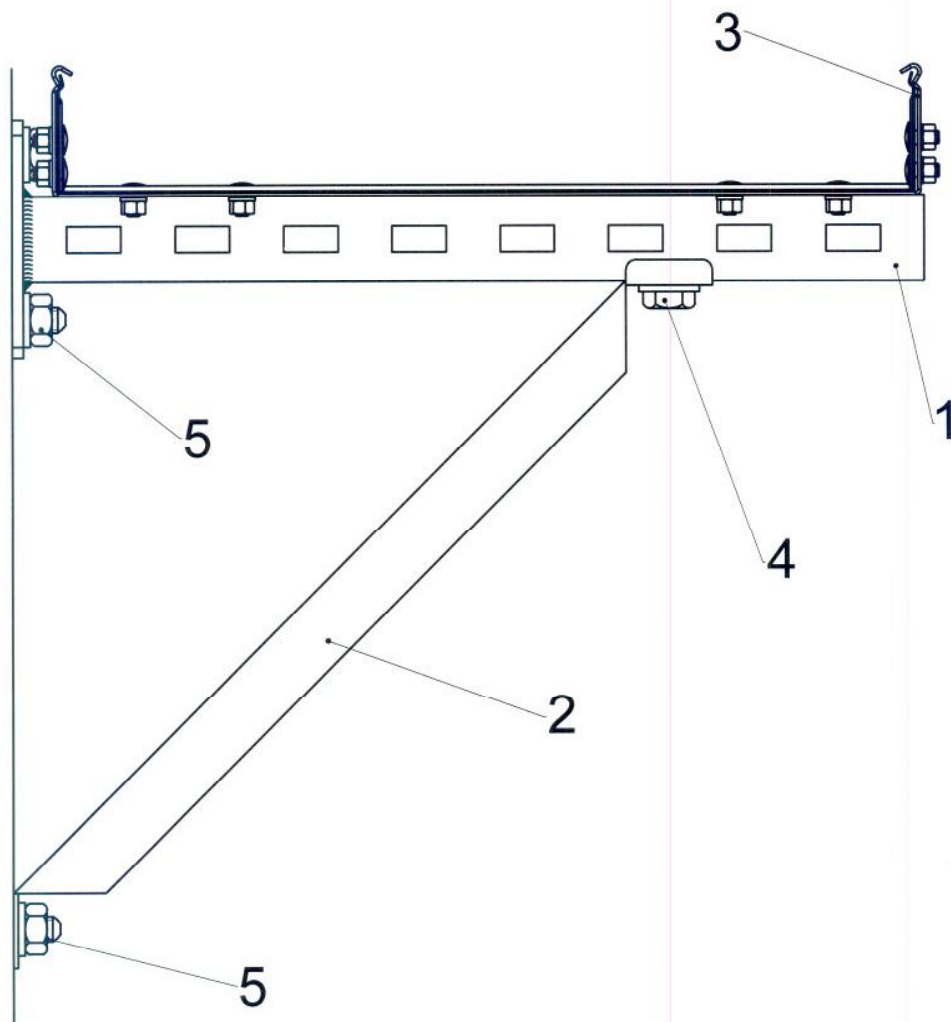
7	śruba tulejowa rozporowa	PSROM10x80	1
6	podkładka	PP8	2
5	nakrętka	NSM8	2
4	pręt gwintowany	PGM8	1
3	tuleja rozporowa stalowa	TRSOM8	1
2	drabikna	DGOP400H60/3	1
1	wspornik fajkowy	WFCO400	1
LP.	NAZWA	SYMBOL	szt.

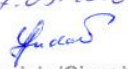
 FIRES S.r.l. POŽIARNA ODOLNOST' FIRE RESISTANCE	Dátum/Date 23. 05. 2020
	Podpis/Signature 
Dokument č. FIRES-FR-C90-10-AWE Document No.	
Príloha č./Appendix No. 35	



	Dátum/Date 24. 05. 2010
	Podpis/Signature <i>Januš</i>
Dokument č. / Document No. <i>FIRES-FR-040-10-AWE</i>	
Príloha č./Appendix No. <i>36</i>	

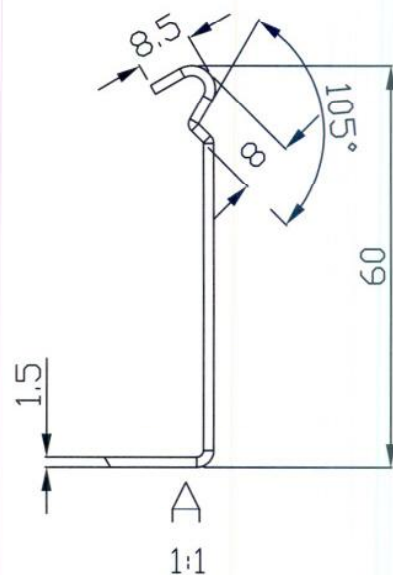
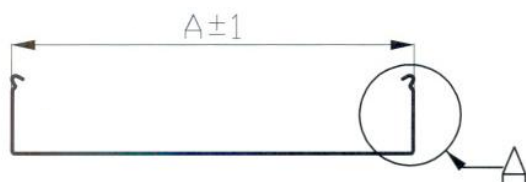
9	šrubá tulejová rozporová	PSROM10x80	1
8	šrubá	SMM10x30	4
7	tulejá rozporová stalová	TRSOM10	1
6	podkládka	PP10	4
5	nakrétka	NSM10	4
4	prét gvwntovaný	PGM10	1
3	korytko	KCOP400H60/3	1
2	drabíkna	DGOP400H60/3	1
1	wsporník fajkový	WFCO400	3
LP.	NAZWA	SYMBOL	szt.



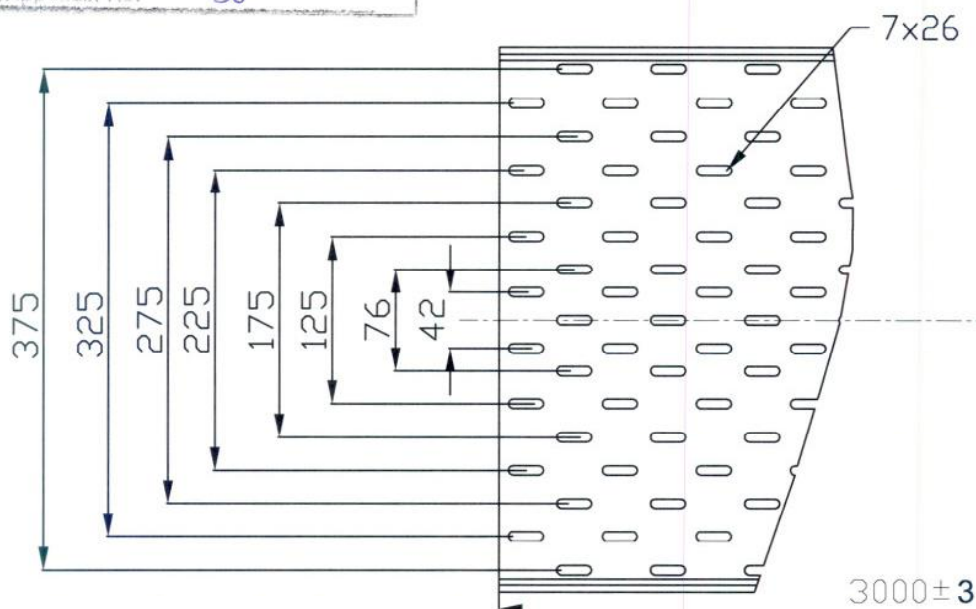
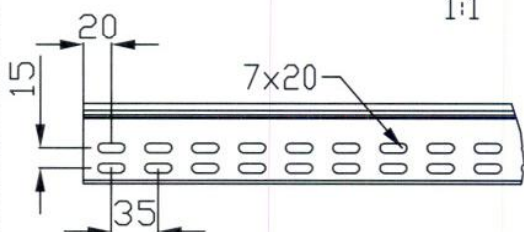
 FIRES S.T.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 24.05.2010
	Podpis/Signature 
Dokument č. Document No. <i>FIRES-FR-090-10-ANNE</i>	
Príloha č./Appendix No. <i>34</i>	

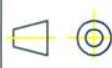
5	šruba tulejowa rozporowa	PRSOM10x80	3
4	šruba	SRM10x30	1
3	korytko	KCOP400H60/3	1
2	podpórka	XXX	1
1	wysięgnik	WPT400	1
LP.	NAZWA	SYMBOL	szt.

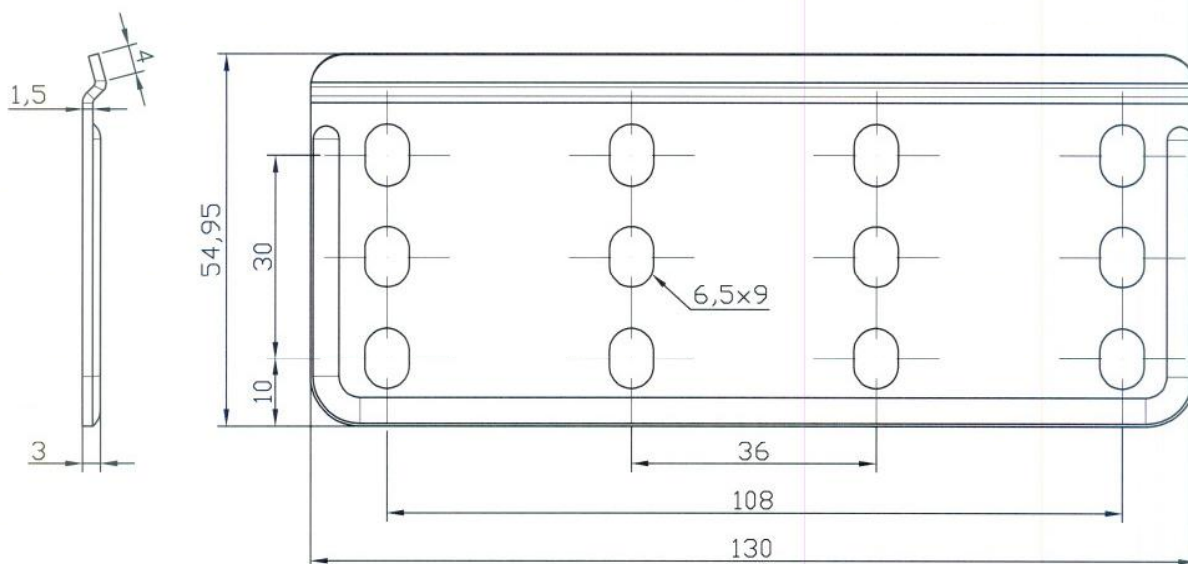
A	Typ	Nr.kat
100	KCP100H60/3N	862010
200	KCP200H60/3N	862020
300	KCP300H60/3N	862030
400	KCP400H60/3N	862040



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	Dokument č. Document No. FIRES-FR-090-10-MWE
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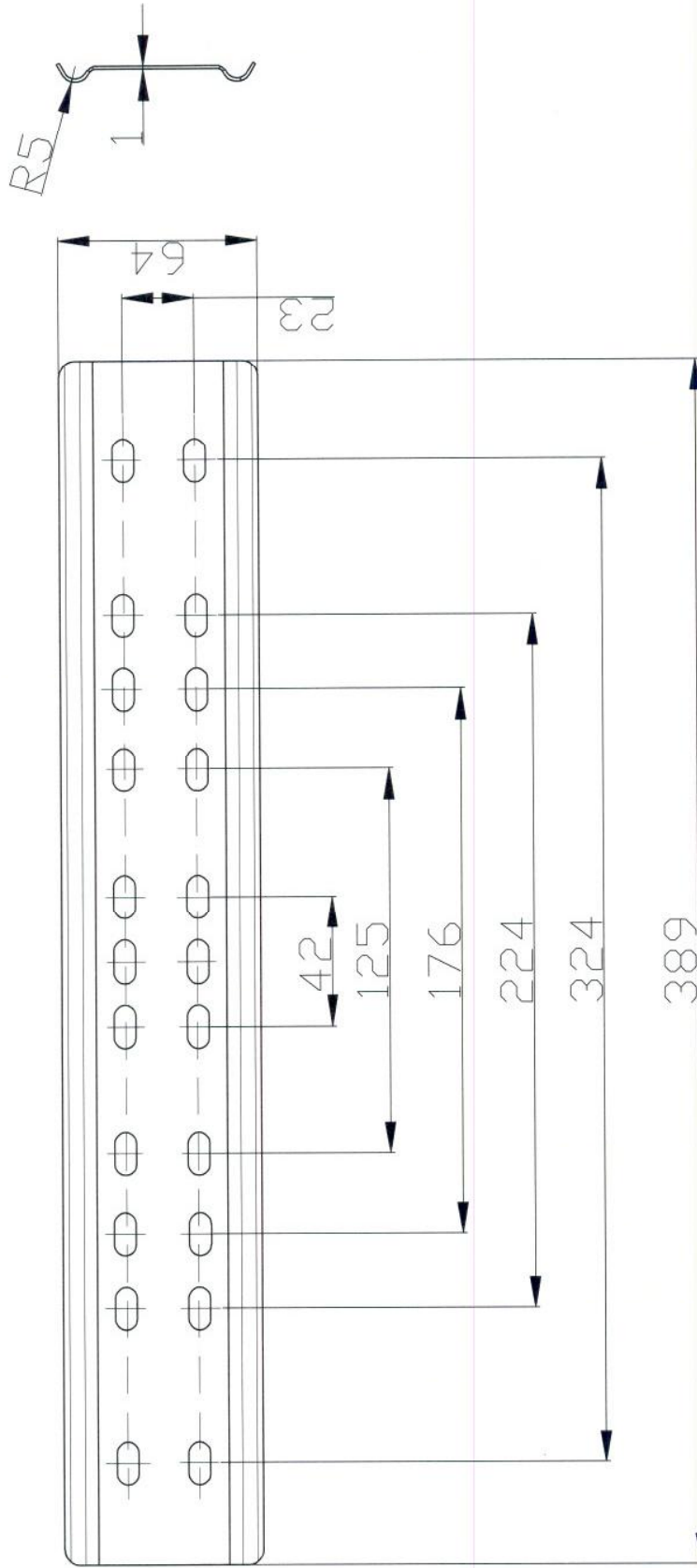


	Odchylka wyniarów nieolerowanych	Materiał Gatunek Nr normy półfabrykat (nr normy)	PN-EN 10142 + A1 : 1997	Masa [kg]	Podziałka	Format A4
						Arkusz
Projektował	J.GROCHOWSKI	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku			Nr rysunku 862040
Rysował	J.Grochowski		KCP400H60/3N			
Sprawdził	T.WŁODARCZYK		Nr programu maszynowego			
Zatwierdził	J.KLICZEK		Nr zlaný			
 Profesjonalne Systemy Tras Kablowych						



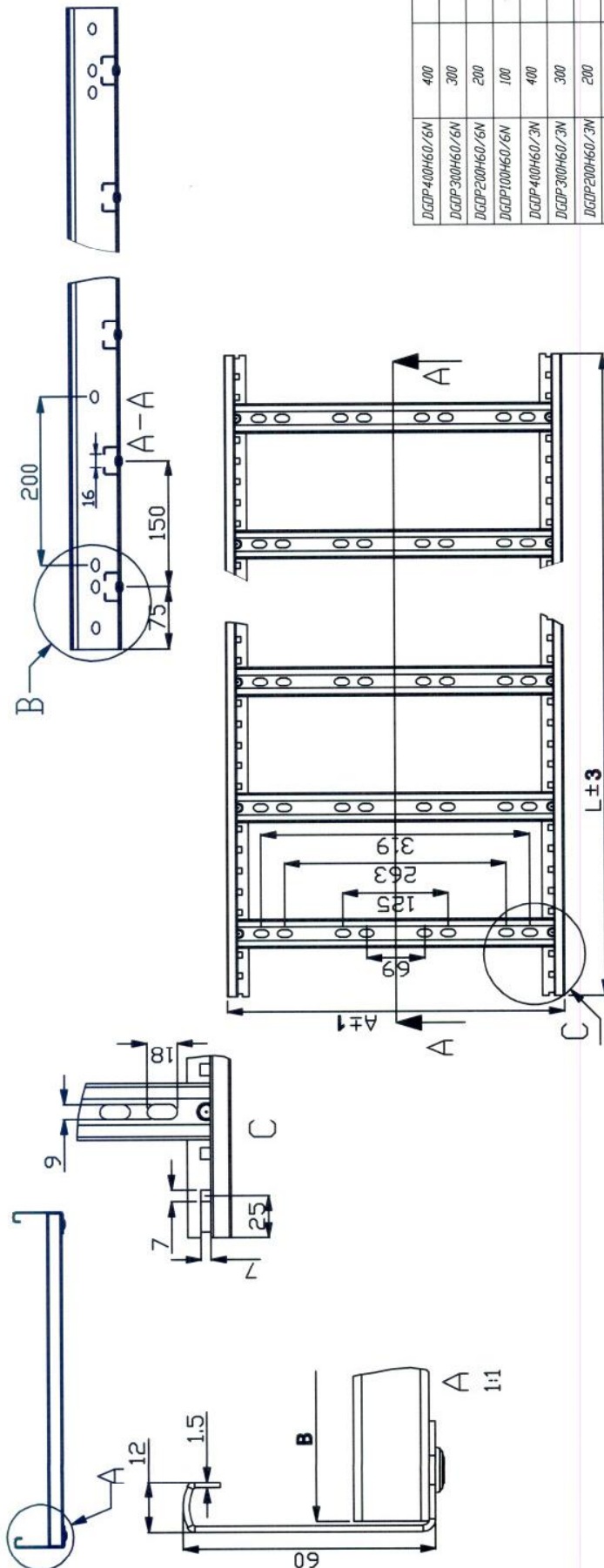
 FIRES S.T.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 27.05.2010
	Podpis/Signature 
Dokument č. / Document No. <i>FIRES-FR-090-10-ANNE</i>	
Příloha č./Appendix No. <i>39</i>	

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

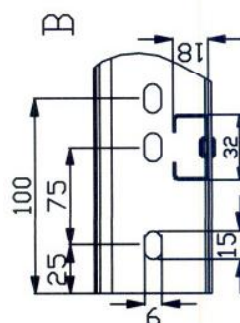


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	Podpis/Signature <i>[Signature]</i>
Dokument č. <i>FIRE-S-FR-090-10-PRU</i> Document No.	
Príloha č./Appendix No. <i>40</i>	

Návrh Design	Skladba Assembly	Materiál Material	Počet Quantity	Množstvo Quantity	Počet Quantity	Množstvo Quantity
Projektant Designer	Skladba Assembly	Materiál Material	Počet Quantity	Množstvo Quantity	Počet Quantity	Množstvo Quantity
Projektant Designer	Skladba Assembly	Materiál Material	Počet Quantity	Množstvo Quantity	Počet Quantity	Množstvo Quantity
Projektant Designer	Skladba Assembly	Materiál Material	Počet Quantity	Množstvo Quantity	Počet Quantity	Množstvo Quantity



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	Podpis/Signature <i>[Signature]</i>
Dokument č. <i>FIRES-FR-090-10-AWE</i>	
Príloha č./Appendix No. <i>31</i>	

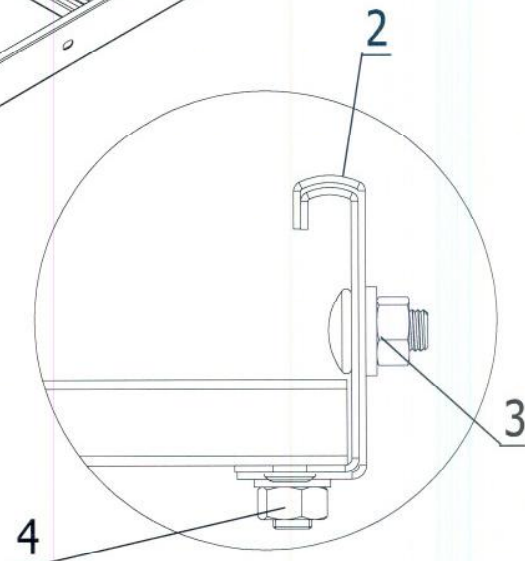
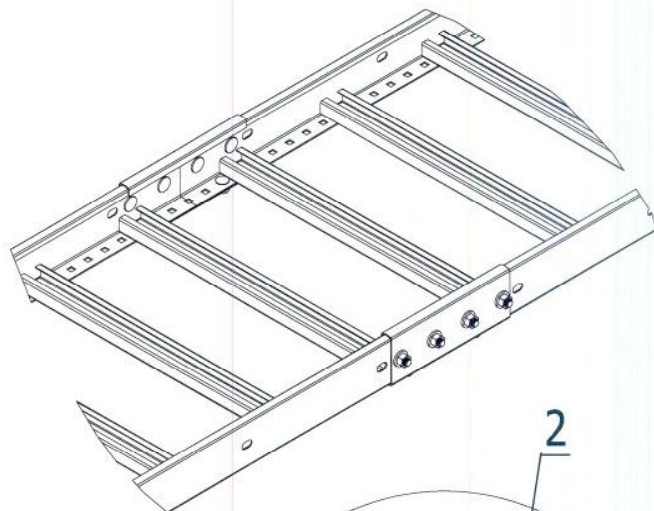
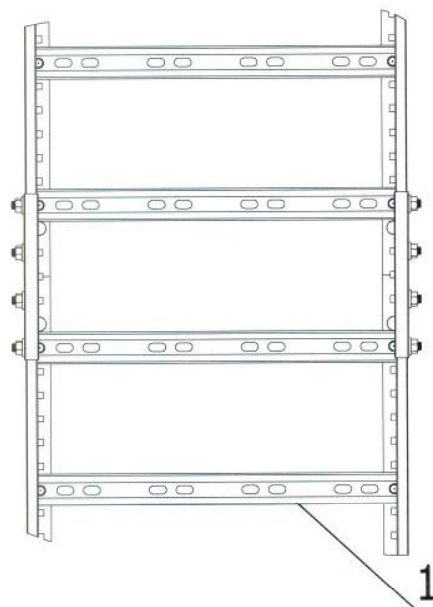
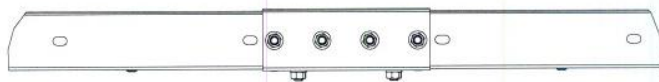


Typ	Szerokość A (mm)	Długość L (mm)	Mr. Kat
DGP400H60/6N	400	6000	863040
DGP300H60/6N	300	6000	863030
DGP200H60/6N	200	6000	863020
DGP100H60/6N	100	6000	863010
DGP400H60/3N	400	3000	863043
DGP300H60/3N	300	3000	863033
DGP200H60/3N	200	3000	863023
DGP100H60/3N	100	3000	863013

Typ	Szerokość A (mm)	Długość L (mm)	Mr. Kat
DGP400H60/6N	400	6000	863040
DGP300H60/6N	300	6000	863030
DGP200H60/6N	200	6000	863020
DGP100H60/6N	100	6000	863010
DGP400H60/3N	400	3000	863043
DGP300H60/3N	300	3000	863033
DGP200H60/3N	200	3000	863023
DGP100H60/3N	100	3000	863013

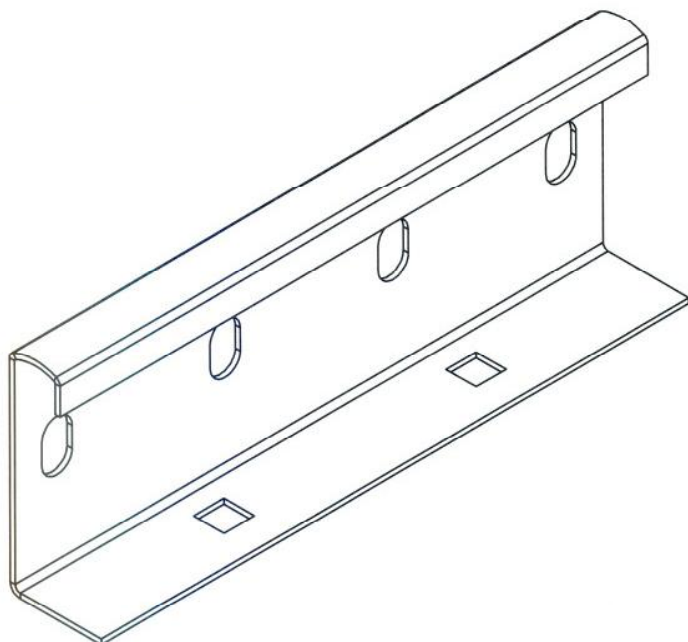
Typ	Szerokość A (mm)	Długość L (mm)	Mr. Kat
DGP400H60/6N	400	6000	863040
DGP300H60/6N	300	6000	863030
DGP200H60/6N	200	6000	863020
DGP100H60/6N	100	6000	863010
DGP400H60/3N	400	3000	863043
DGP300H60/3N	300	3000	863033
DGP200H60/3N	200	3000	863023
DGP100H60/3N	100	3000	863013

Profesjonalne Systemy Tras Kablowych

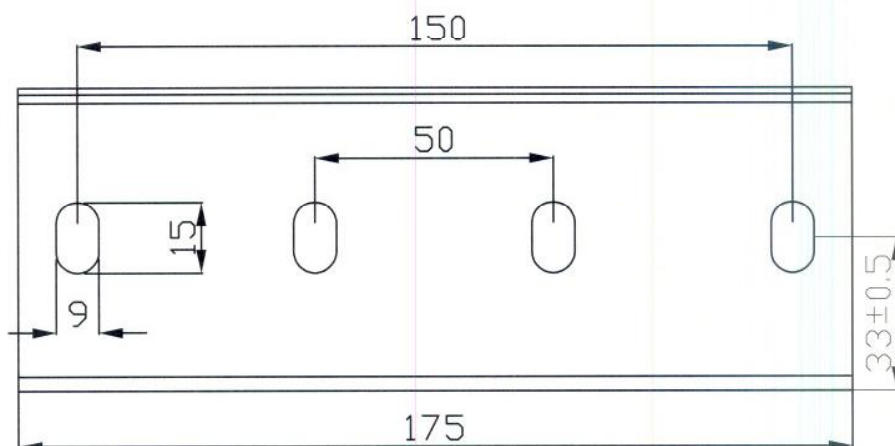
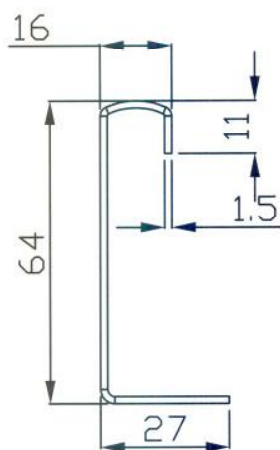
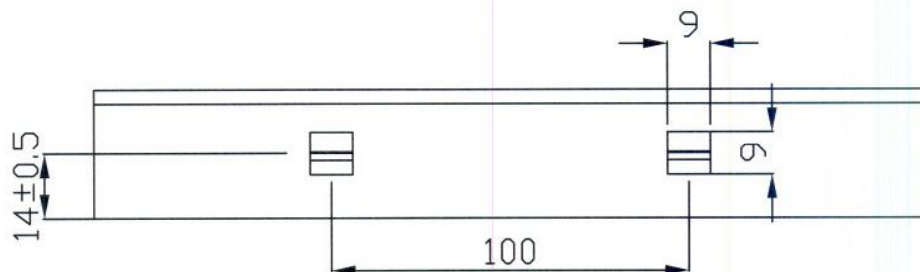


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	Dokument č. Document No. <i>FIRES-FR-040-10-AWE</i>
Příloha č./Appendix No. <i>40</i>	

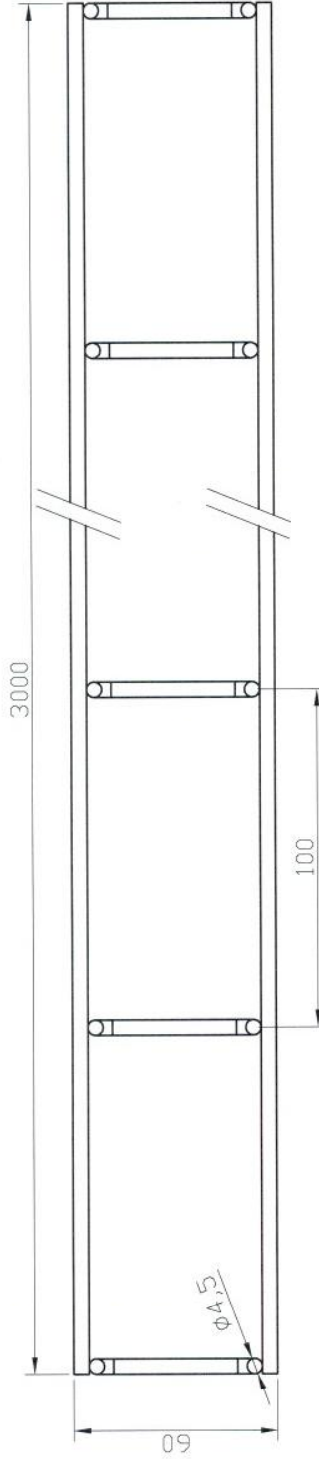
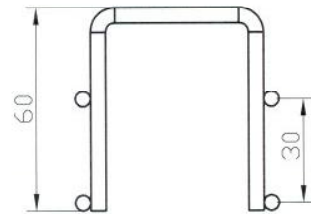
4	śruba	SGN M6x12		4	650442			
3	śruba	SGN M8x14		8	650142			
2	łącznik	LDONCH60		2	863000			
1	DRABINKA	DGONP400H60		1	863043			
Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.			
	Odchyłka wymiarów nietolerowanych		Gatunek	Masa [kg]	Podziałka	Format	A4	
			Nr normy			PN-EN 10327:2005	Arkusz	1
			polifabrykat (nr normy)				Arkuszy	1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku				
Rysował				21-Nov-06				
Sprawił								
Zatwierdził								
				Nr programu maszynowego	Nr zmiany			
				Nr rysunku				
				Profesjonalne Systemy Tras Kablowych				



 FIRES S.T.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 29.05.2010
	Podpis/Signature <i>J. Grochowski</i>
Dokument č. Document No. <i>FIRES-FR-090-10-MVE</i>	
Príloha č./Appendix No. <i>43</i>	



	Dokladka vyměření netolerovaných		Materiál	Gatunek		Masa (kg)	Podziałka	Format	A4								
				Nr normy				Arkusz									
				półfabrykat (nr normy)				Arkuszy									
Projektował	J. GROCHOWSKI	Podpis	Data	2010.05	Nazwa rysunku L D D N C H 60												
Rysował	J. Grochowski			2010.05													
Sprawdził	T. WŁODARCZYK			2010.05													
Zatwierdził	JKLICZEK			2010.05													
 Profesjonalne Systemy Tras Kablowych			Nr programu Nazwybowego 863000			Nr zmiany <table border="1" style="width: 100px; height: 40px;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>											

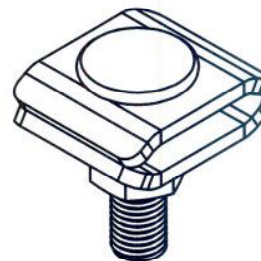
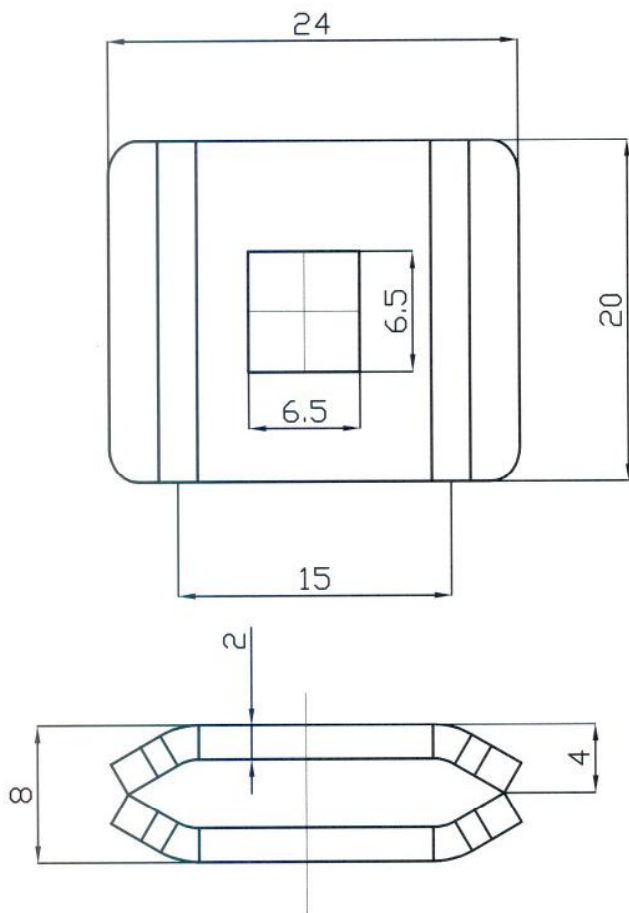


	Dátum/Date 24.05.2008
	Podpis/Signature <i>[Signature]</i>
Dokument č. FIRES-PR-090-10-MWE Document No.	
Príloha č./Appendix No. 44	

	Dĺžka výroby netolerovaných	Materiál Gatunek Nr normy półfabrykat (nr normy)	Masa [kg] Podziałka Ornament A4 AFKUSZ 1 AFKUSZY 1
Nazwa rysunku KDS060H60/3			
Nr programu maszynowego ---			
Nr rysunku ---			
Nr złączy 			

Profesjonalne Systemy
Tras Kablowych

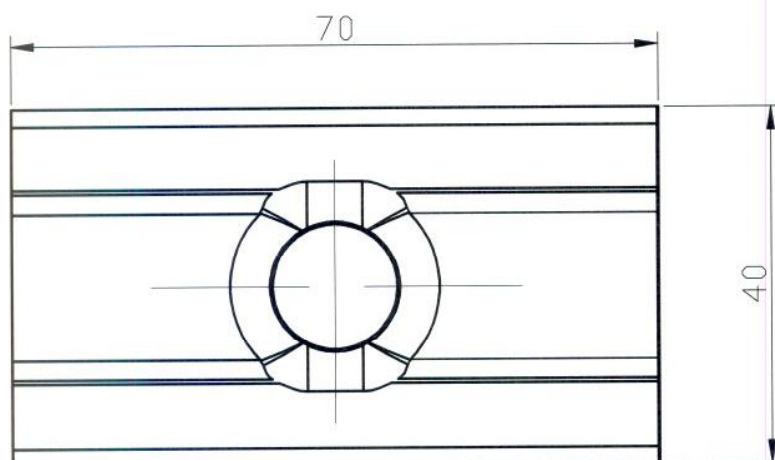
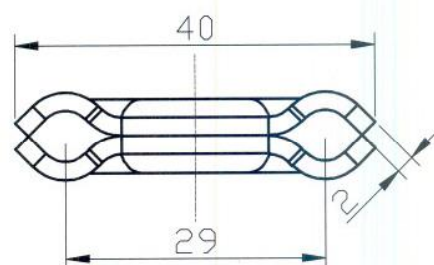
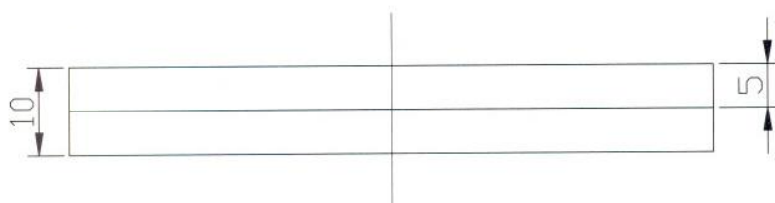
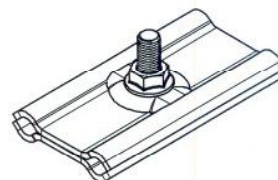




 FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>24.05.2010</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-090-10-MVE</i>	
Príloha č./Appendix No. <i>45</i>	

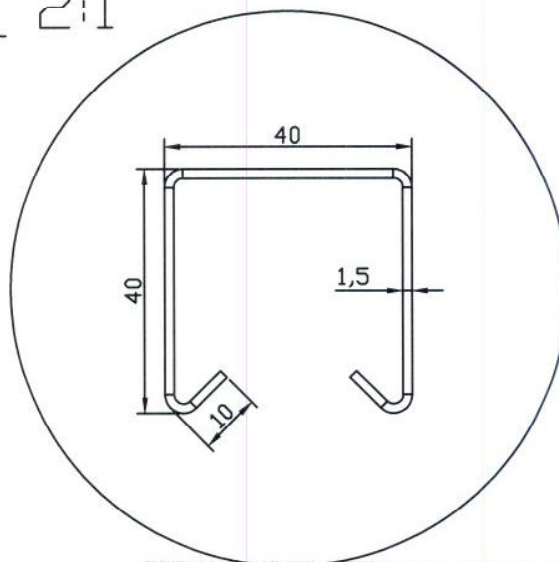
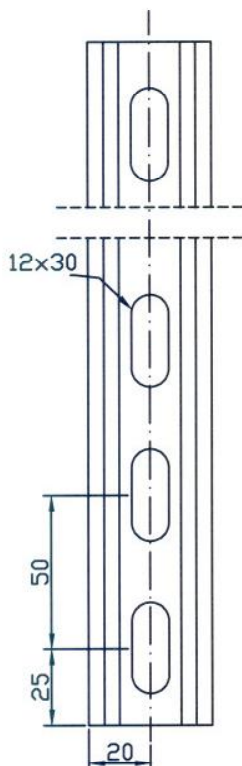
 Odchylka (výnimky) netolerovaných	M. Stawikowski M. Stawikowski _____ _____	Podpis _____ _____	Materiał Gatunek Nr normy półfabrykat (nr normy)	St3S PN-EN 10142 + A1 : 1997 _____	Masa (kg) _____	Podziałka _____	Format Arkusz Arkuszy	A4 1 1
Projektował Rysował Sprawdził Zatwierdził	Nazwisko _____ _____ _____	Data 10.12.2007 _____	Nazwa rysunku Uchwyt śrubowy USSD					
			Nr programu maszynowego ---					Nr zmiany _____
 Profesjonalne Systemy Tras Kablowych			Nr rysunku 3					_____ _____ _____

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	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-FR-090-10-MWE</i>
Príloha č./Appendix No. <i>46</i>	

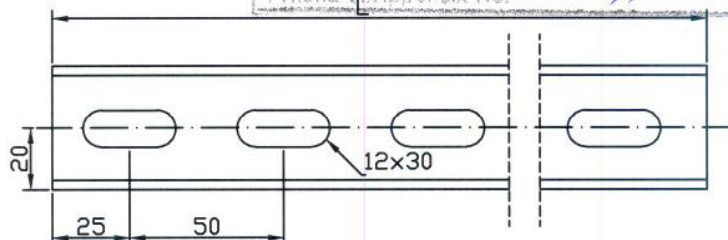
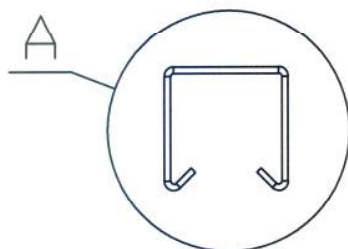


	Dýchadla výfukové netokované	Materiál Gátunek Nr normy półfabrykat (nr normy)	Blacha stalocynknet.Sędzina PN-EN 10327:2005	Masa (kg) 0,07	Podziałka 	format A4
			20.10.05	20.10.05	20.10.05	20.10.05
Projektował Rysował Sprawdził Zatwierdził	M.Stawikowski M.Stawikowski 	Podpis 	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku Uchwyť šrubový USSPW		
Profesjonalne Systemy Tras Kablowych				Nr rysunku 806200		Nr zmienny

A 2:1

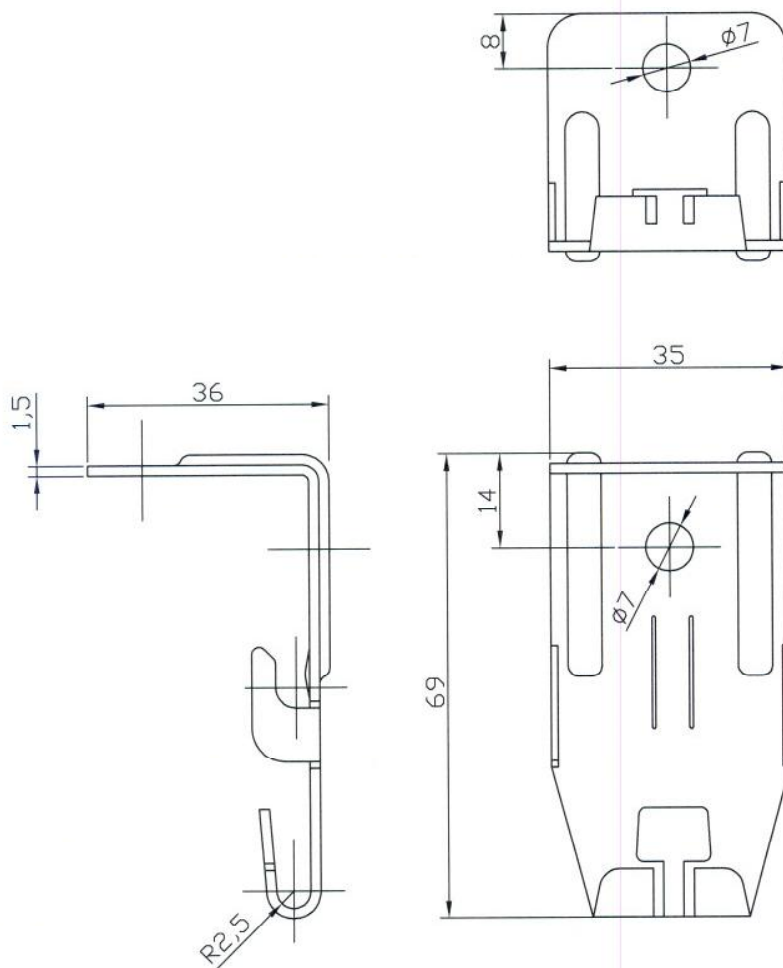


 FIRES S.T.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 28.05.2010
	Podpis/Signature <i>Jacek S</i>
Dokument č. Document No. <i>FIRES-FR-090-10-ANNE</i>	
Príloha č./Appendix No. <i>48</i>	



5	Ceownik wzmacniony	CWDP40H40/ 2	805320	2000	3,50
4	Ceownik wzmacniony	CWDP40H40/05	805305	500	0,88
3	Ceownik wzmacniony	CWDP40H40/04	805304	400	0,70
2	Ceownik wzmacniony	CWDP40H40/03	805303	300	0,53
1	Ceownik wzmacniony	CWDP40H40/02	805302	200	0,35
LP	Nazwa wyrobu	Symbol	Nr Katalogowy	L [mm]	Masa [kg]

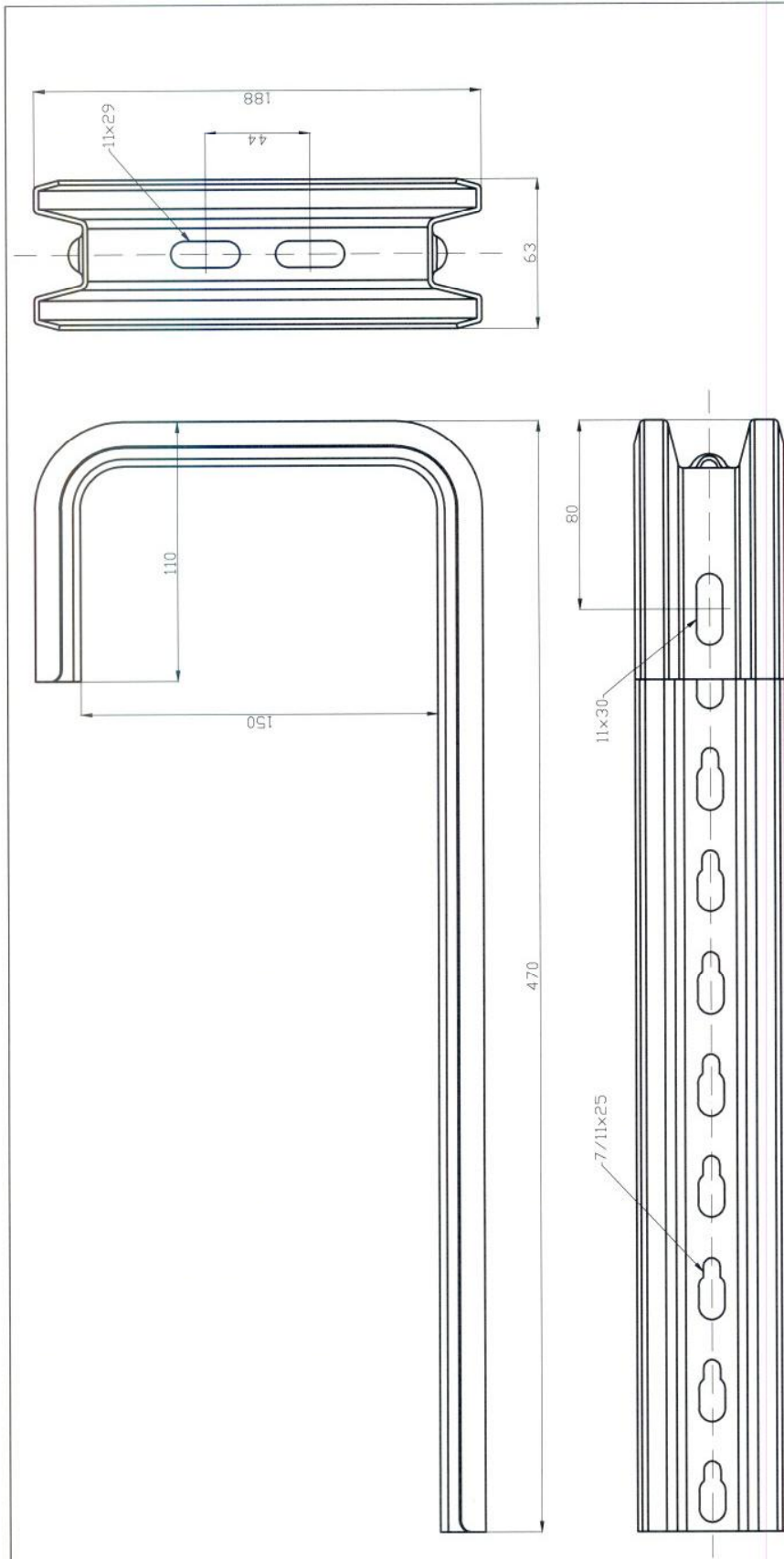
 Długość nieolerowanych	Grubość (mm) 1,5	Materiał Gatunek Nr normy PN 0118N9 półfabrykat (nr normy)	Blacha kwasoodporna Masa [kg] ---	Podziałka 1:1	Format A4 Arkusz --- Arkuszy ---
Projektował	Jacek Grochowski	Data 20.10.05 20.02.08 20.02.08 20.02.08	Nazwa rysunku CWDP40H40/...		
Rysował	Jakub Rudak		Nr rysunku 8053.....		
Sprawił	Jacek Kliczek		Nr zmiany		
Zatwierdził	Jacek Kliczek				
 Profesjonalne Systemy Tras Kablowych					



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	Podpis/Signature <i>[Signature]</i>
Dokument č. / Document No. <i>FIRES-FR-090-10-NAWE</i>	
Príloha č./Appendix No. <i>48</i>	

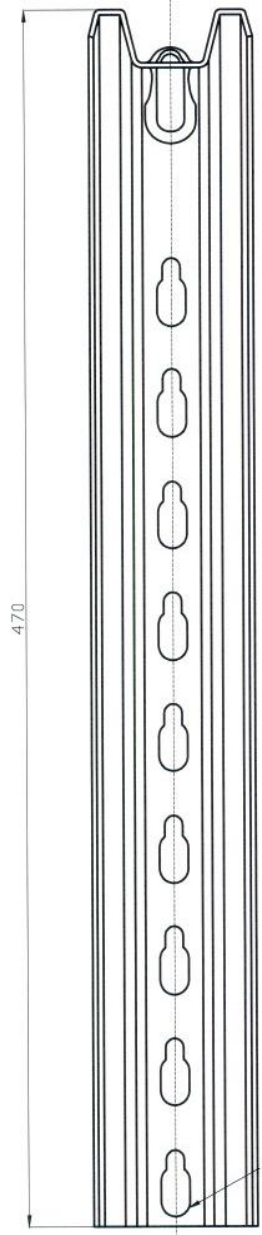
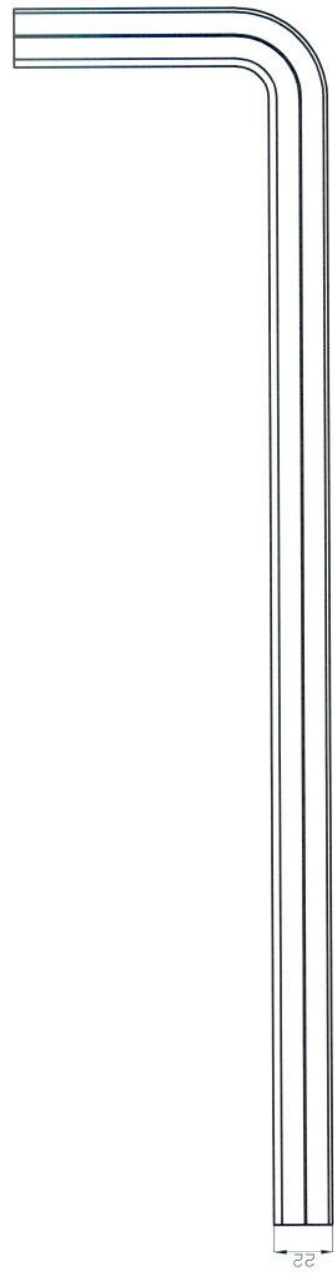
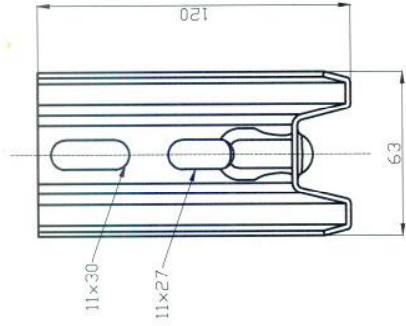
	Odchyłka wymiarów nietolerowanych	±0,5	Materiał Nr normy PN-EN 10327:2005 półfabrykat (nr normy)	Masa [kg] ---	Podziałka 1:1	Format A4 Arkusz -- Arkuszy --
Projektował	Nazwisko Podpis Data	Jakub Rudak Jacek Kliczek Jacek Kliczek	Nazwa rysunku WKSD60	Nr rysunku 864100		
Rysował						
Sprawił						
Zatwierdził						
 Profesjonalne Systemy Tras Kablowych			Nr zmiany			

	Dátum/Date 24. 05. 2013
	Podpis/Signature <i>[Signature]</i>
Dokument č. / FIRE-S- FR-090-12-AWE Document No.	
Príloha č./Appendix No.	49



	Ddchylka wymiarów nie tolerowanych	Gatunek Nr normy półfabrykat (nr normy)	Masa [kg] ---	Podzielnik 4:1	Formát A4 Arkusz Arkuszy
Projektował Rysował Sprawdził Zatwierdził	Nazwa G. Matuszewski	Data 04.06.10	Nr rysunku ---		
Podpis <i>[Signature]</i>			Nr zmiany ---		
Profesjonalne Systemy Tras Kablowych					



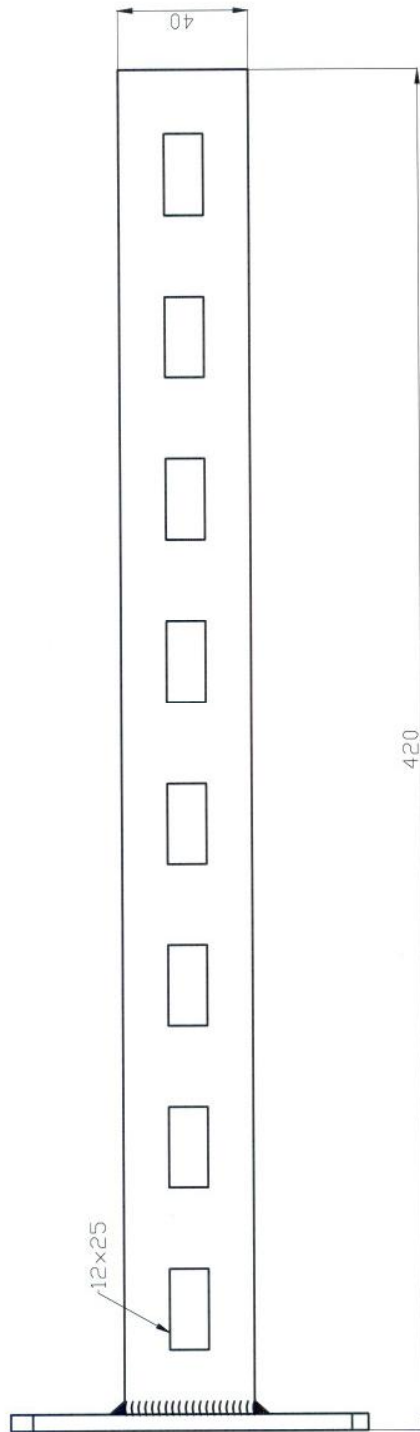
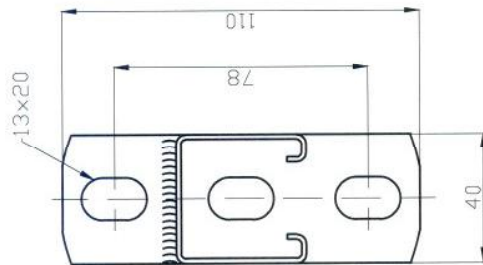


11/7x25

	Dátum/Date	24.05.2013
	Podpis/Signature	<i>[Signature]</i>
Dokument č. Document No.	F.I.R.E.S.-FR-090-10-AWE	
Příloha č./Appendix No.	50	

	Dřchytka výměrů netolerovaných	G. Matuszewski Podpis	Nazwisko	Nazwa rysunku	Masa [kg]	Podzielnik	Format
	Projektował Rysował Sprawdził Za twierdził	Nazwa rysunku	Nazwa rysunku	Nazwa rysunku	Nazwa rysunku	Nazwa rysunku	Nazwa rysunku
Profesjonalne Systemy Tras Kablowych							
Nr rysunku							
Nr zmiany							

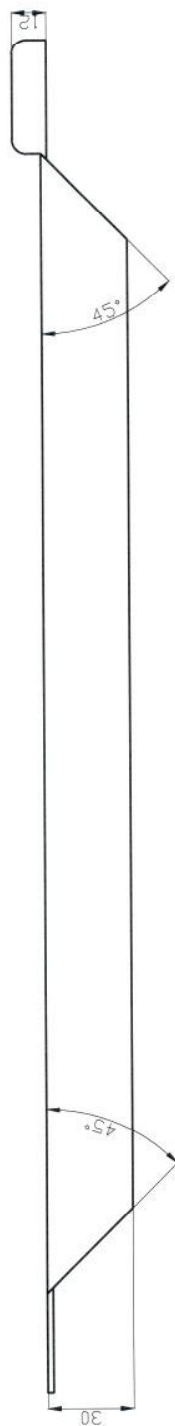
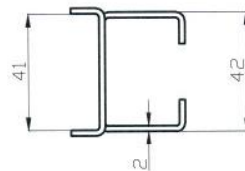
WFL 400



FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>24. 05. 2013</i>
	Podpis/Signature <i>[Signature]</i>
	Dokument č. <i>FIRE5-FR-042-10-AWE</i>
Document No.	
Príloha č./Appendix No. <i>51</i>	

	Podchytka výměrů netolerovaných	Materiál Nr normy požiborykat (nr normy)	Masa (kg) ---	Podziatka 4:1	Formát A4 Arkusz Arkuszy
Projektował Rysował Sprawdził Zatwierdził	Nazwisko <i>G. Matuszewski</i> Podpis	Data <i>04.06.10</i>	Nr rysunku ---		
Profesjonalne Systemy Tras Kablowych			Nr zmlony ---		

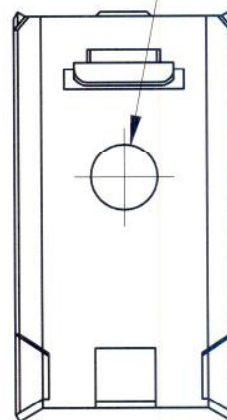
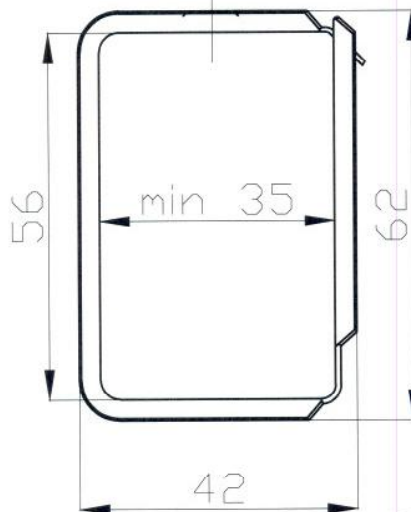
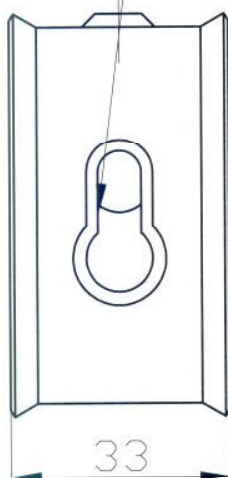


[illegible]

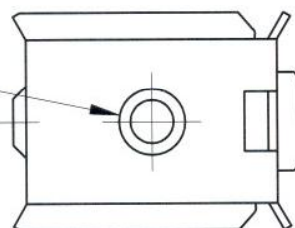
6/10x21

Ø6.5

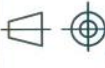
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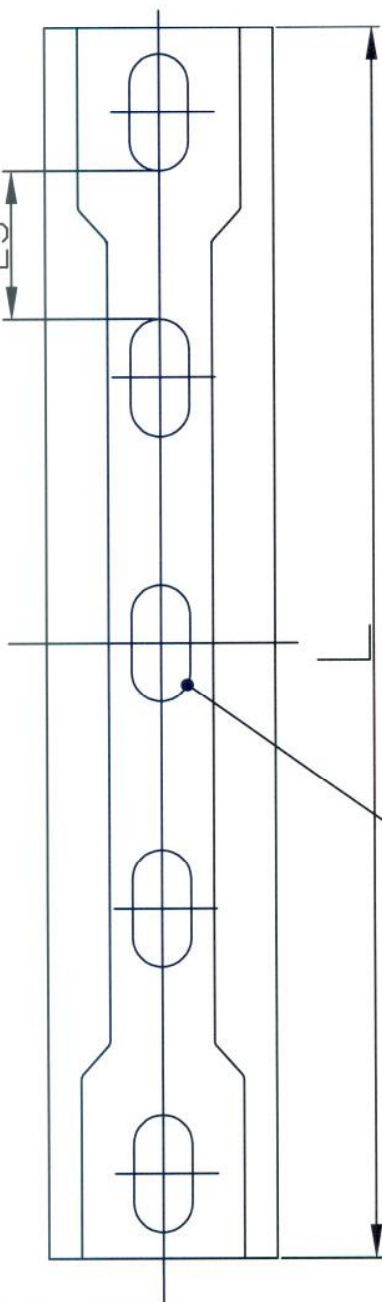
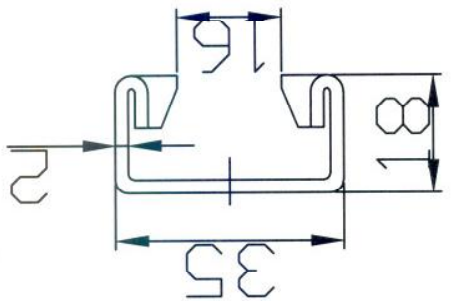


Ø10



 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 29.05.2010
	Podpis/Signature <i>Janek S</i>
	Dokument č. Document No. <i>FIRES-FR-090-10-NWE</i>
Príloha č./Appendix No. <i>53</i>	

	Odchylka vymiarov netolerovaných	Materiál Gatunek Nr normy Półfabrykat (nr normy)	Masa (kg)	Podziałka 1:1	Format A4 Arkusz 1 Arkuszy
Projektował	Nazwisko G. Matuszewski Podpis	Data 2010.06.04	Nazwa rysunku <i>Obje jma 0ZM0</i>		
Rysował					
Sprawdził					
Zatwierdził					
 Profesjonalne Systemy Tras Kablowych			Nr programu maszynowego Nr rysunku		Nr zmiany

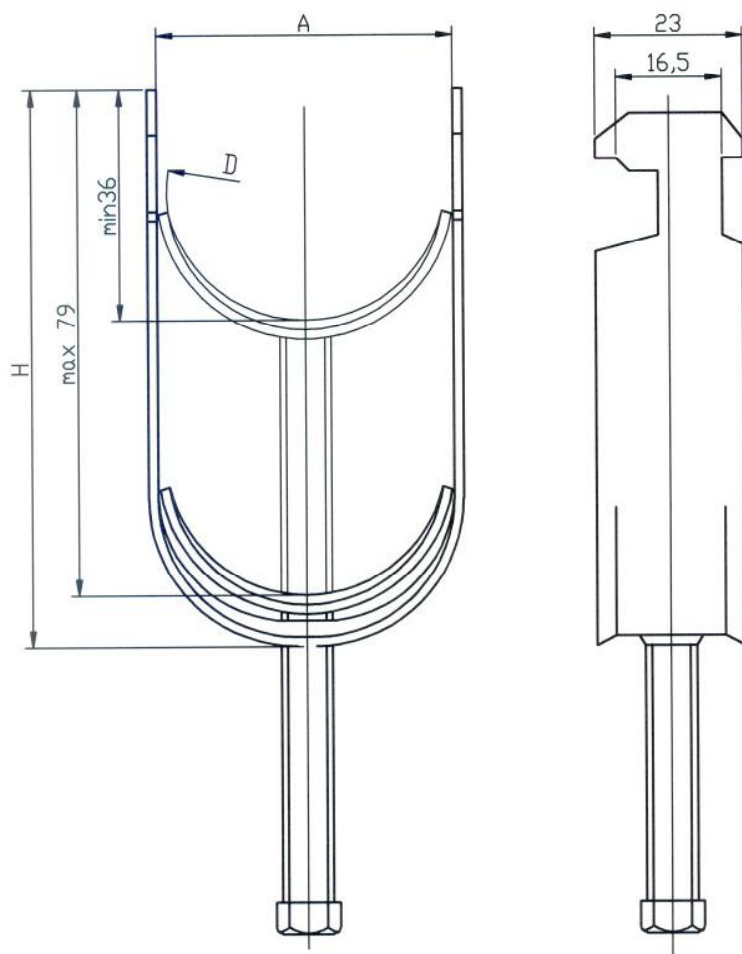


9x18

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

	Dátum/Date	29.05.2020
	Podpis/Signature	<i>[Signature]</i>
	Dokument č. / FIRE-PR-090-10-AWE	
	Document No.	
Priloha č./Appendix No.		59

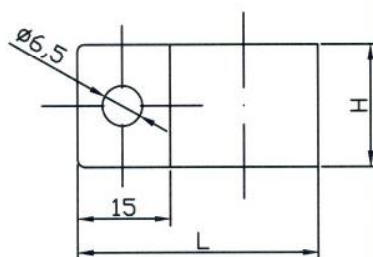
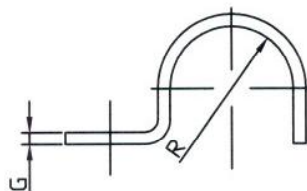
	Projektor	
	Rysownik	G. Matuszewski
	Sprawdzil	
	Zatwierdził	
Nazwa rysunku		SZCZEBEL SDOC...
Data		28.01.09
Nazwa rysunku		SZCZEBEL SDOC...
Profesjonalne Systemy Tras Kablowych		Nr katalogu



 FIRES S.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 24.05.2010
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-010-10-AVNE</i>	
Príloha č./Appendix No. <i>55</i>	

UK01/58-64	66	103	64
UK01/46-52	54	97	52
UK01/40-46	48	86	46
UK01/34-40	42	78	40
UK01/28-34	36	71	34
UK01/22-28	30	61	28
UK01/16-22	24	57	22
SYMBOL	A	H	ØD

	Odchylka výměrů nietolerovaných	Material Gatunek Nr normy półfabrykat (nr normy)	Masa (kg) -----	Podziałka 1:1	Format A4
					Arkusz 1
Projektował	T.Grudniewski	Data 2004.12.29 2004.12.29 2004.12.29 2004.12.29	Nazwa rysunku <i>UK01/40-46</i>		
Rysował	J.Jasinski		Nr programu maszynowego ---	Nr złańy	
Sprawdził	J.Kliczek			Nr rysunku	
Zatwierdził	J.Kliczek				
 Profesjonalne Systemy Tras Kablowych					



FIRES S.R.O.
POŻIARNA ODOLNOŚĆ
FIRE RESISTANCE

Dátum/Date
22.05.2010

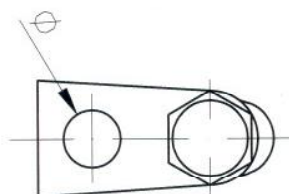
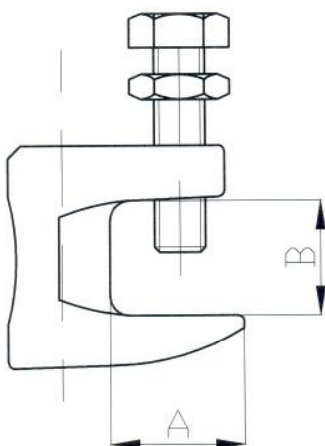
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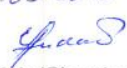
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Príloha č./Appendix No. **56**

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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
LP	Nazwa wyrobu	Symbol	Nr Katalogowy	R [mm]	L [mm]	H [mm]	G [mm]

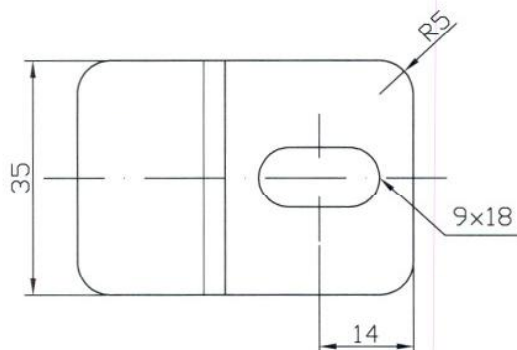
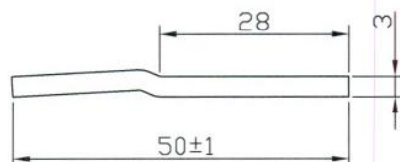
	Długość wymiarów nieolerowanych	$\pm 0,5$	Gatunek Nr normy półfabrykat (nr normy)	PN-EN 10327:2005 -----	Masa [kg] ---	Podziałka 1:1	Format A4									
							Arkusz -- Arkusz --									
Projektował Rysował Sprawdził Zatwierdził	Jacek Grochowski Jakub Rudak Jacek Kliczek Jacek Kliczek	20.10.05 20.02.08 20.02.08 20.02.08	Nazwa rysunku UDF 5-43				Nr zmiany									
Profesjonalne Systemy Tras Kablowych			Nr rysunku 4055.....				<table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>									



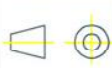
 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Datum/Date 29.05.2010
	Podpis/Signature 
Dokument č. Document No. FIRES-FIR-090-10-MNE	
Příloha č./Appendix No. 54	

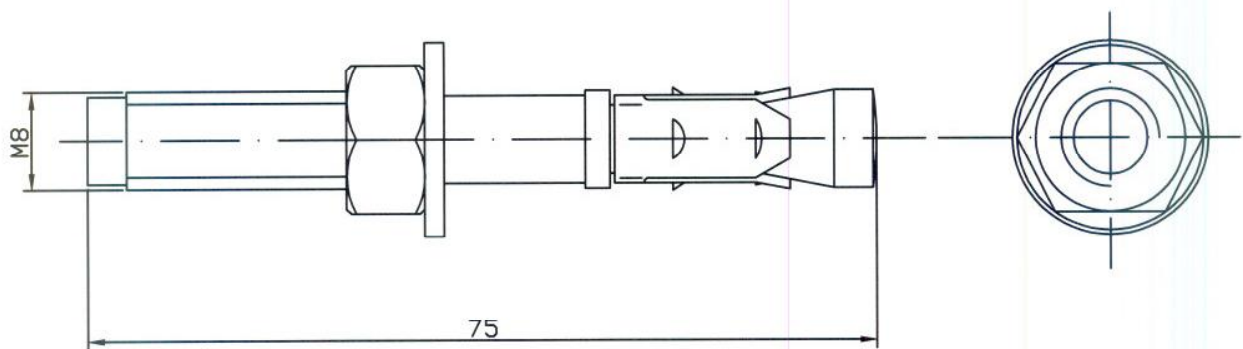
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1	zacisk	ZK8	Ø9	18	21
LP	Nazwa wyrobu	Symbol	Ø	B	C

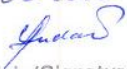
	Odchyłka wymiarów nietolerowanych	$\pm 0,5$	Gatunek Nr normy PN-EN 10327:2005	Masa [kg] ---	Podziałka 1:1	Format A4
Projektował	Nazwisko G. Matuszewski	Podpis	Data 04.06.10	Nazwa rysunku ZK		
Rysował	Podpis	Podpis	Data	Nr rysunku		
Sprawdzał	Podpis	Podpis	Data	Nr ziany		
Zatwierdził	Podpis	Podpis	Data	Nr ziany		
Profesjonalne Systemy Tras Kablowych				Nr ziany		



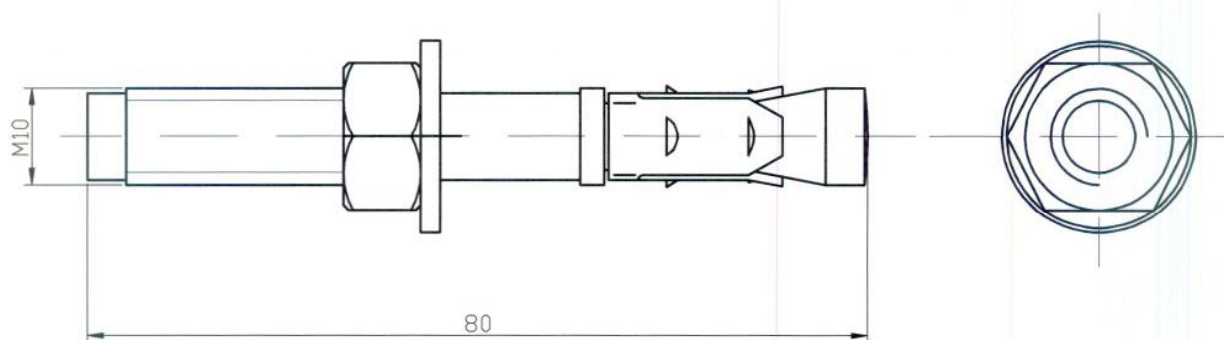
 FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 24.05.2010  Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-090-10-MWE</i>
Příloha č./Appendix No. <i>58</i>	

	Odchyłka wymiarów nietolerowanych $\pm 0,5$	Gatunek Nr normy półfabrykat (nr normy)	----- PN-EN 10327:2005 -----	Masa [kg] 0,025	Podziałka 1:1	Format A4 Arkusz -- Arkuszy --									
							Projektował Rysował Sprawdził Zatwierdził	Tomasz Grudniewski Jakub Rudak Jacek Kluczek Jacek Kluczek	Podpis _____ _____ _____ _____	Data 29.12.04 20.02.08 20.02.08 20.02.08	Nazwa rysunku <i>ZMOE</i>				
 Profesjonalne Systemy Tras Kablowych			Nr rysunku <i>802900</i>	Nr zmiany <table border="1"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>											



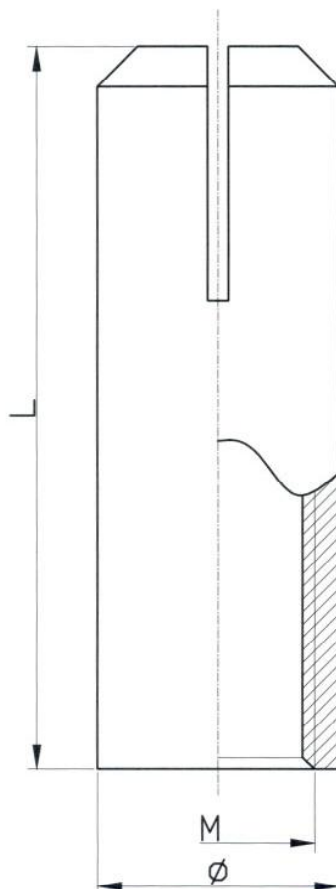
 FIRES s.r.o. POZIARNA ODOLNOST' FIRE RESISTANCE	Datum/Date 24.05.2010  Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-090-10-AWE</i>
Příloha č./Appendix No. <i>59</i>	

	Dachytka wymiarów nietolerowanych		Materiał Gatunek Nr normy półfabrykat (nr normy)	Stal cynkowana galwanicznie Masa [kg]	Podziałka 1:1	Format A4 Arkusz Arkuszy
Projektował J.GROCHOWSKI	Nazwa J.GROCHOWSKI T.WŁODARCZYK J.KLICZEK	Podpis _____ _____ _____	Data 20.10.05	Nazwa rysunku PSRDM8x75		
Rysował J.GROCHOWSKI			20.10.05	Nr rysunku 804100		
Sprawdził T.WŁODARCZYK			20.10.05	Nr zmiany		
Zatwierdził J.KLICZEK			20.10.05	_____ _____ _____		
 Profesjonalne Systemy Tras Kablowych						



FIRES S.T.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 27.05.2010
	<i>[Signature]</i> Podpis/Signature
	Dokument č. Document No. FIRES - FR-090-10-PWE
Príloha č./Appendix No. 60	

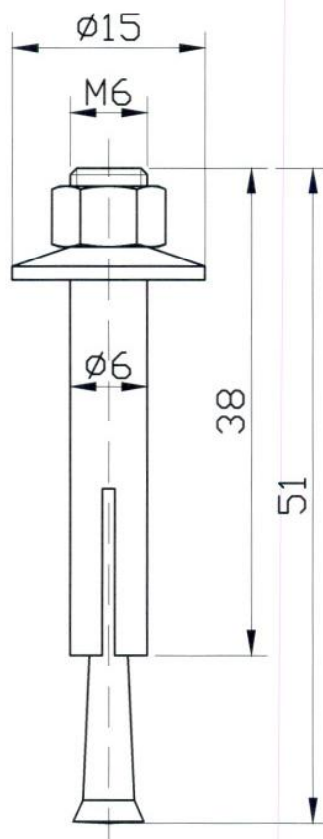
Odchylka wyniorów nie tolerowanych		Gatunek Stal cynkowana galwanicznie Nr normy półfabrykat (nr normy)	Masa [kg]	Podziałka 1:1	Format A4
					Arkusz
Projektował	J.GROCHOWSKI	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku		
Rysował	J.Grochowski		PSROM10x80		
Sprawdził	T.WŁODARCZYK				
Zatwierdził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

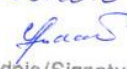


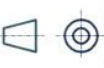
	Dátum/Date <i>24. 05. 2010</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-090-10-MWE</i>	
Príloha č./Appendix No. <i>61</i>	

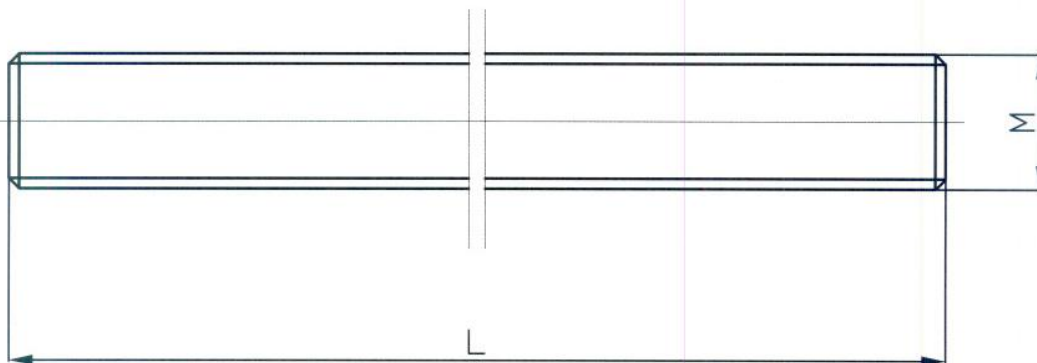
TRSDM10	12	M10	40
TRSDM8	10	MB	30
NAZWA	Ø	M	L

	Długość wymiary niezależnych	Materiał	Gatunek	Masa (kg) ---	Podziałka 4:1	Format	A4	
			Nr normy			Arkusz		
			półfabrykat (nr normy)			Arkuszy		
Projektował	G.Matuszewski	Podpis _____ _____ _____ _____	20.10.05	Nazwa rysunku <i>TRSDM...</i>			Nr zmiany _____ _____ _____ _____	
Rysował	G.Matuszewski		Data					20.10.05
Sprawdził	--							20.10.05
Zatwierdził	--							20.10.05
			Profesjonalne Systemy Tras Kablowych		Nr rysunku ---			



 FIRES S.T.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 24.05.2010  Podpis/Signature
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Příloha č./Appendix No. <i>62</i>	

	Długość wymiarów nietolerowanych		Materiał Gatunek stal kwasoodporna Nr normy półfabrykat (nr normy)	Masa [kg] ---	Podziałka 2:1	Format A4 Arkusz Arkuszy									
Projektował Rysował Sprawdził Zatwierdził	Nazwisko <i>G. Matuszewski</i> Podpis _____ Data 29.01.09	Nazwa rysunku <i>SRDM6x30</i> <i>Śruba rozporowa</i>				Nr zmiany <table border="1" style="width: 100px; height: 40px;"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>									
 Profesjonalne Systemy Tras Kablowych		Nr rysunku ---													



 FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 24.05.2012
	Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-090-10-AWE</i>
Priloha č./Appendix No. <i>63</i>	

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

	Odchyłka wymiarów nie tolerowanych	Materiał	Gatunek	5,8	Masa (kg) ---	Podziałka	Format	A4
			Nr normy	---			Arkusz	1
			półfabrykat (nr normy)				Arkuszy	1
Projektował	Nazwisko M.Stawikowski Podpis	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku Preł gwintowany PGM...					
Rysował								
Sprawdził								
Zatwierdził								
Profesjonalne Systemy Tras Kablowych			Nr programu maszynowego ---				Nr zlaný	
			Nr rysunku 7					