

TEST REPORT FIRES-FR-198-08-AUNE

Cable bearing system BAKS with cables



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FIRES, s.r.o.

Notifikovaná osoba č./ Notified Body No.: 1396

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Osloboditeľov 282, 059 35 Batizovce, Slovakia

Tel.+421 52 775 2298, Fax+421 52 7881412, e-mail: info@fires.sk, www.fires.sk

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TEST REPORT

Test report number: **FIRES-FR-198-08-AUNE**

Tested property: Function in fire

Test method: DIN 4102 – 12:1998-11

Date of issue: **29. 10. 2008**

Name of the product: Cable bearing system BAKS with cables

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

Task No.: PR-08-0381

Specimen received: 15. 09. 2008

Date of the fire test: 18. 09. 2008

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

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(electronic version)Copy No.2: **BAKS Kazimierz Sielski**, ul. Jagodne 5, 05-480 Karczew, Poland
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1. INTRODUCTION

This test report contains the results of the test carried out at the testing laboratory of FIRES s.r.o. in Batizovce. The purpose of the test was product classification. The test specimen was cable bearing system BAKS with power and communication non-halogen cables with circuit integrity maintenance. Persons witnessing the test:

Representatives of the sponsor: Mr. Kliczek (BAKS)
 Mr. Stawikowski (BAKS)
 Mr. Kwiatkowski (TECHNOKABEL)
 Mr. Stradomski (TECHNOKABEL)

Test directed by: Mr. Štefan Rástocký
 Test carried out by: Mr. Miroslav Hudák
 Operator: Mr. Alexander Reľovský

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2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 002	Horizontal test furnace for fire testing	-
F 69 005	PLC system for data acquisition and control TECOMAT NS 950	-
F 40 008	Software 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 (software)	-
F 71 008, F 71 009	Transducer of differential pressure (from -50 to +150) Pa	pressure inside the test furnace
F 08 521, F 08 522, F 08 523, F 08 524 F 08 525, F 08 526, F 08 527, F 08 528	Plate thermometers	temperature inside the test furnace, according to EN 1363-1 a DIN 4102-2
F 08 701	Sheathed thermocouple type K ϕ 3 mm	ambient temperature
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	climatic conditions
F 60 001 – F 60 009	Temperature and relative air humidity sensors	climatic conditions
F 54 057	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 was carried out by workers of the test sponsor. Mounting of cables and weights into the supporting system was carried out by workers businesses BAKS and TECHNOKABEL.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing systems BAKS with accessories – trays, ladders, wire trays and power and communication non-halogen cables business TECHNOKABEL S. A..

Cables:	NHXXH 4x1,5 RE FE180 PH30/E30	(8 x)
	NHXXH 4x50 RM FE180 PH30/E30	(8 x)
	NHXXCH 4x1,5/1,5 RE FE180 PH30/E30	(4 x)
	NHXXCH 4x50/25 RM FE180 PH30/E30	(4 x)
	NHXXH 4x1,5 RE FE180 PH90/E90	(7 x)
	NHXXH 4x50 RM FE180 PH90/E90	(7 x)
	NHXXH 1x35 RM FE180 PH90/E90 with joint SMH1	(1 x)
	NHXXCH 4x1,5/1,5 RE FE180 PH90/E90	(7 x)
	NHXXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4	(1 x)
	NHXXCH 4x16/16 RE FE180 PH90/E90	(1 x)
	NHXXCH 4x50/25 RM FE180 PH90/E90	(7 x)
	HTKSH 1x2x1,0 FE180 PH90/E30-E90	(4 x)
	HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	(6 x)

Suspension track No. 1: was made of three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x500) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80, producer DROMET) in spacing of 1500 mm. Wire trays (type KDSO 400H60/3E rustless, Ø wire 4,5 mm) were fixed at upper supports and wire trays (type KDSO 400H60/3N, Ø wire 4,5 mm) were fixed at under supports. Load-bearing system was loaded with 20 kg/m.

Suspension track No. 2: was made of nine consoles combined of three straight supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x800) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80). Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm), T-lengths of trays (type TKPOP 400/H60 steel sheet thickness 1,5 mm) and bends of trays (type KPPOP 400/H60 steel sheet thickness 1,5 mm) were jointed together with screws M6 (type SGN M6x12) and fixed at upper and under supports with screws M6 (type SGN M6x12) and were loaded with 10 kg/m. Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) T-lengths of ladders (type TDOP 400H60, steel sheet thickness 1,5 mm) and bends of ladders (type LDOP 400H60, steel sheet thickness 1,5 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and were fixed at central supports with screws M8 (type SGN M8x14) and were loaded with 20 kg/m.

Suspension track No. 3: was made by six consoles combined of three horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x800) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80). Ladders (type DGOP 400H60/3N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) T-lengths of ladders

(type TDOP 400H60, steel sheet thickness 1,5 mm) and bends of ladders (type LDOP 400H60, steel sheet thickness 1,5 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type

SGN M8x14) and were fixed at upper supports with screws M8 (type SGN M8x14) and were loaded with 20 kg/m. Trays (type KCOP 400H60/3N, steel sheet thickness 1,5 mm), T-lengths of trays (type TKPOP 400/H60 steel sheet thickness 1,5 mm) and bends of trays (type KPPOP 400/H60 steel sheet thickness 1,5 mm) were jointed together with screws M6 (type SGN M6x12) and were fixed at central and under supports with screws M6 (type SGN M6x12) and were loaded with 10 kg/m.

Types of individual components are from catalogue BAKS.

Dowels (type PSRO M10x80) were from producer DROMET Sp.J. S.W.H. Drazikowscy, Chylice Kolonia, ul. 3 Maja 4, 96-313 Jaktorów, Poland.

Heat-shrink straight-through joints were from producer Cellpack AG Electrical Products, Anglikerstrasse 99, CH-5612 Villmergen, Switzerland.

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 specimen construction is shown in the drawings which form the appendix of this test report. Drawings were delivered by the sponsor of the test.

All the information about technical specifications of used materials and semi-products, information about their type sign and their producers were delivered by sponsor. This information was not subject of the specimen inspection. Parameters which were checked are quoted in paragraph 4.3 SPECIMEN INSPECTION.

4.2 DESCRIPTION OF THE 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 SPECIMEN INSPECTION

Before and after the fire testing, conformity of the test specimen with drawing was checked. The specimen corresponded to the drawing which create appendix of this report.

Specimen inspection consisted of visual review of the test specimen as well as size verification (number and cross sections of conductors, thickness, measurements of cables and trays).

4.4 CLIMATIC CONDITIONING

Test specimens were stored in the climatic hall and conditioned according to EN 1363-1 under the following climatic conditions:

Relative air humidity [%]		Ambient air temperature [°C]	
mean	standard deviation	mean	standard deviation
48,5	2,8	22,7	0,4

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

5. CARRYING OUT THE TEST

5.1 TEST CONDITIONS

Conditions in the test furnace (temperature, pressure, content O₂ content) as well as conditions in the testing room (ambient temperature) corresponded to EN 1363-1 and DIN 4102-2 during the whole test. Detailed information is shown in appendices of this report or in quality records of the testing laboratory.

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

Date of fire test	Relative air humidity [%]	Ambient air temperature [°C]
18. 09. 2008	53,5	13,4

5.2 TEST RESULTS

The measured values are shown in tables that form an integral part of this test report.

5.3 EVALUATION OF THE TEST

SPECIMENS	Time to first failure/interruption of conductor
Specimen 1: cables NHXH 4x50 RM FE180 PH30/E30	20 minutes
Specimen 2: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 3: cables NHXH 4x1,5 RE FE180 PH30/E30	90 minutes no failure/interruption
Specimen 4: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 5: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 6: cable NHXH 4x50 RM FE180 PH30/E30	82 minutes
Specimen 7: cables NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 8: cables NHXH 4x1,5 RE FE180 PH30/E30	40 minutes
Specimen 9: cables NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 10: cable NHXH 4x50 RM FE180 PH30/E30	80 minutes
Specimen 11: cable NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 12: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 13: cable NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 14: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 15: cable NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 16: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 17: cable NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 18: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 19: cables NHXH 4x1,5 RE FE180 PH30/E30	88 minutes
Specimen 20: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30	90 minutes no failure/interruption
Specimen 21: cables NHXH 4x50 RM FE180 PH30/E30	48 minutes
Specimen 22: cables NHXCH 4x50/25 RM FE180 PH30/E30	76 minutes
Specimen 23: cable NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 24: cable NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 26: cable NHXCH 4x16/16 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 28: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 29: cable NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 30: cable NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 31: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 32: cable NHXH 4x50 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 33: cable NHXCH 4x50/25 RM FE180 PH90/E90	90 minutes no failure/interruption
Specimen 34: cable NHXH 4x1,5 RE FE180 PH90/E90	90 minutes no failure/interruption

SPECIMENS	Time to first failure/interruption of conductor
Specimen 35: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	90 minutes no failure/interruption
Specimen 36: cables NHXH 4x1,5 RE FE180 PH30/E30	48 minutes
Specimen 37: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30	41 minutes
Specimen 38: cable NHXH 4x50 RM FE180 PH30/E30	90 minutes no failure/interruption
Specimen 39: cable NHXCH 4x50/25 RM FE180 PH30/E30	90 minutes no failure/interruption
Specimen 40: cable NHXH 4x50 RM FE180 PH30/E30	90 minutes no failure/interruption
Specimen 41: cable NHXCH 4x50/25 RM FE180 PH30/E30	90 minutes no failure/interruption
Specimen 46: cable NHXH 1x35 RM FE180 PH90/E90 with joint SMH1	90 minutes no failure/interruption
Specimen 47: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4	90 minutes no failure/interruption
Specimen 52A: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	86 minutes
Specimen 52B: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	82 minutes
Specimen 53A: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	73 minutes
Specimen 53B: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	54 minutes
Specimen 54A: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	90 minutes no failure/interruption
Specimen 55A: cable HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	90 minutes no failure/interruption
Specimen 56A: cable HTKSH 1x2x1,0 FE180 PH90/E30-E90	90 minutes no failure/interruption
Specimen 57A: cable HTKSH 1x2x1,0 FE180 PH90/E30-E90	90 minutes no failure/interruption
Specimen 58A: cable HTKSH 1x2x1,0 FE180 PH90/E30-E90	90 minutes no failure/interruption
Specimen 59A: cable HTKSH 1x2x1,0 FE180 PH90/E30-E90	52 minutes

The fire test was discontinued in 96th minute at the request of sponsor.

Specimens S1 – S47 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S59 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

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 DIN 4102 – 12:1998-11. Any significant deviation with respect to size, constructional details, loads, stresses, edges 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 Ltd. 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 Ltd. Batizovce.

Report checked by: Ing. Štefan Rástocký

Translated by: Ing. Marek Rusnák

Issued by:

Responsible for the technical side of this report:


Ing. Štefan Rástocký
leader of the testing laboratory




Miroslav Hudák
technician of the testing laboratory

7. NORMATIVE REFERENCES

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

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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	43,3	43,1	42,6	52,6	29,4	20,2	38,5	31,2	37,6	20,0	13,8	0,0	0,0
5	584,8	545,3	571,1	589,2	518,3	467,6	556,5	580,8	551,7	576,4	14,1	-6,1	11,7
10	697,1	700,6	728,7	702,2	682,0	687,3	720,6	748,5	708,4	678,4	14,5	0,3	10,3
15	717,3	712,4	745,3	721,5	774,2	694,1	763,7	793,5	740,3	738,5	15,0	0,6	10,9
20	783,9	759,4	797,8	811,0	782,5	708,4	777,8	833,0	781,7	781,4	15,4	0,4	11,3
25	818,8	795,5	835,3	858,2	812,9	737,0	811,8	871,7	817,7	814,6	15,8	0,3	12,6
30	843,6	840,6	873,6	887,9	838,0	781,6	863,3	910,0	854,8	841,8	16,4	0,5	12,9
35	876,0	875,6	902,7	916,8	861,3	822,9	899,8	939,3	886,8	864,8	16,4	0,8	13,7
40	903,5	903,3	925,5	946,4	883,9	857,4	925,7	960,4	913,3	884,7	16,5	1,1	12,7
45	923,9	921,9	938,7	969,6	903,5	892,5	948,9	975,3	934,3	902,3	17,7	1,4	11,4
50	935,1	947,6	956,8	975,6	915,7	925,4	971,6	990,8	952,3	918,1	17,2	1,7	13,1
55	963,4	948,1	937,5	931,8	929,5	956,1	966,9	965,4	949,8	932,3	17,1	1,7	10,1
60	941,8	948,6	934,9	911,4	948,2	938,0	936,8	925,2	935,6	945,3	17,8	1,5	12,1
65	957,8	961,2	945,2	915,5	964,6	952,5	944,1	917,1	944,8	957,3	17,7	1,3	15,6
70	972,7	972,6	953,6	921,6	982,9	963,1	950,4	926,4	955,4	968,4	17,3	1,0	14,1
75	980,9	990,8	976,1	949,3	987,7	1000,0	989,0	973,9	981,0	978,7	17,0	0,9	18,3
80	988,2	1007,0	991,9	964,3	997,0	1016,0	1004,0	993,0	995,2	988,4	16,5	0,9	18,7
85	994,4	1019,0	1004,0	978,1	1002,0	1028,0	1017,0	1009,0	1006,4	997,4	16,4	0,9	18,7
90	1002,0	1024,0	1011,0	991,5	1008,0	1037,0	1031,0	1024,0	1016,1	1005,9	16,3	0,9	19,6
95	1008,0	1035,0	1022,0	1002,0	1017,0	1043,0	1038,0	1038,0	1025,4	1014,0	16,4	0,9	18,1

Tave Average temperature in the test furnace calculated from plate thermometers

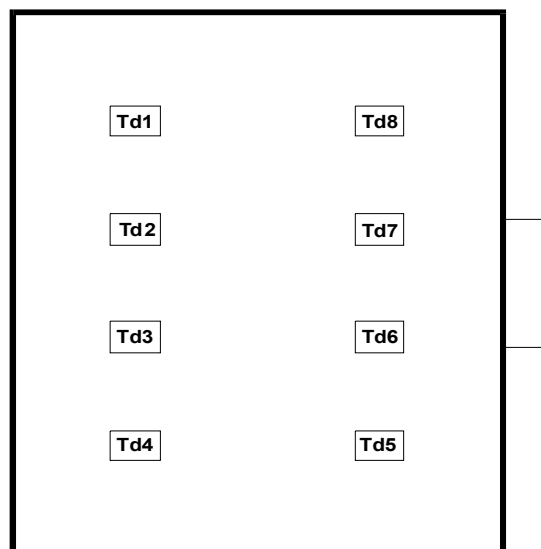
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

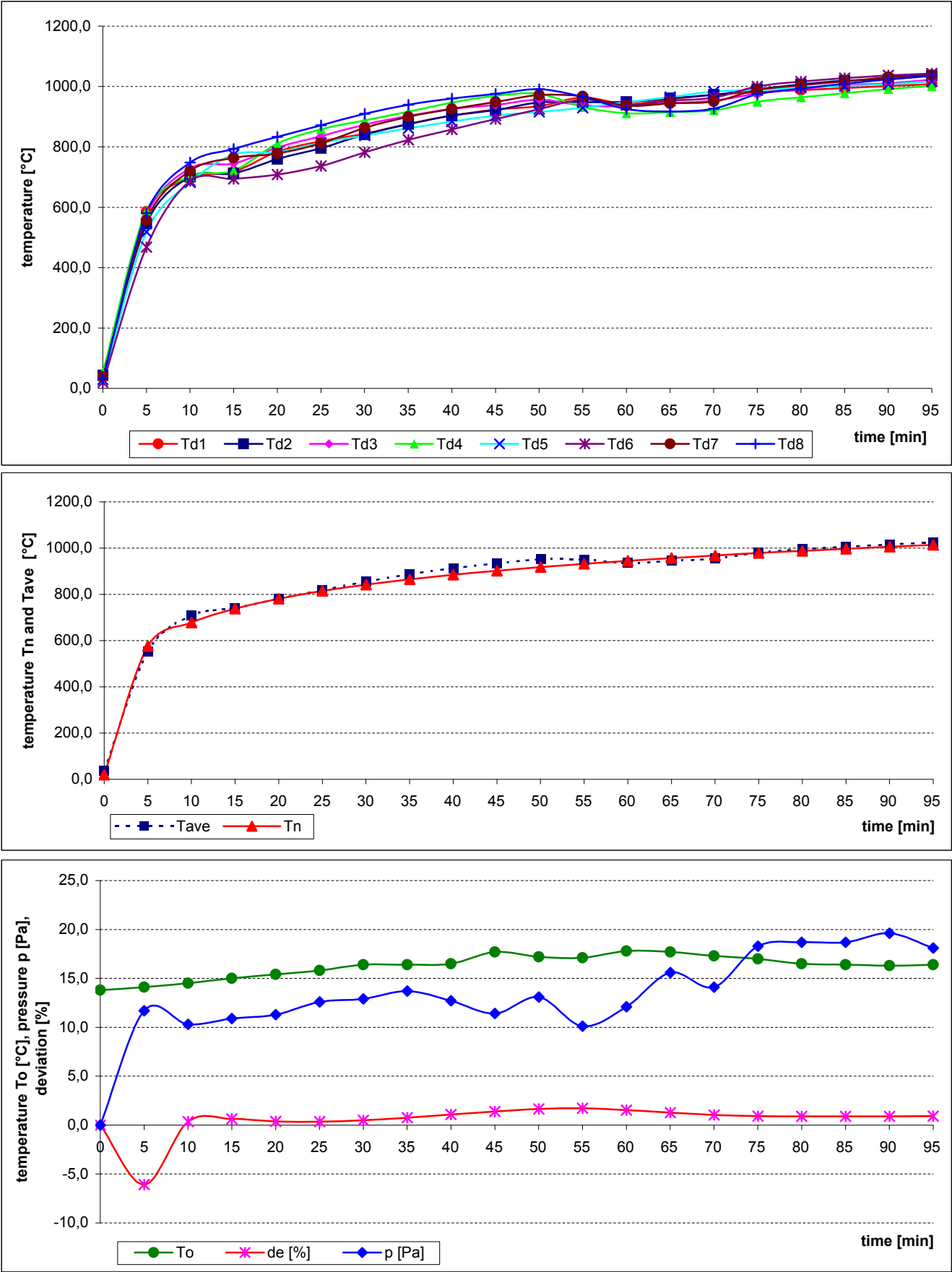
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline

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 S8

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S1	1-L1	20:46
	2-L2	x
	3-L3	x
	4-PEN	x
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	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	x
	22-L2	x
	23-L3	82:59
	24-PEN	x
S7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S8	29-L1	x
	30-L2	x
	31-L3	40:56
	32-PEN	x

Specimen 1: cables NHXH 4x50 RM FE180 PH30/E30
Specimen 2: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 3: cables NHXH 4x1,5 RE FE180 PH30/E30
Specimen 4: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 5: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 6: cable NHXH 4x50 RM FE180 PH30/E30
Specimen 7: cables NHXH 4x50 RM FE180 PH90/E90
Specimen 8: cables NHXH 4x1,5 RE FE180 PH30/E30

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 S9 to S16

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption
S10	37-L1	x
	38-L2	x
	39-L3	80:47
	40-PEN	x
S11	41-L1	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S12	45-L1	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
S15	57-L1	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

Specimen 9: cables NHXH 4x1,5 RE FE180 PH90/E90
Specimen 10: cable NHXH 4x50 RM FE180 PH30/E30
Specimen 11: cable NHXH 4x1,5 RE FE180 PH90/E90
Specimen 12: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 13: cable NHXH 4x50 RM FE180 PH90/E90
Specimen 14: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 15: cable NHXH 4x50 RM FE180 PH90/E90
Specimen 16: cable NHXCH 4x50/25 RM FE180 PH90/E90

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

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

Measured time of tested specimens from S17 to S24

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
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	x
	75-L3	88:54
	76-PEN	x
S20	77-L1	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption
S21	81-L1	48:21
	82-L2	x
	83-L3	x
	84-PEN	x
S22	85-L1	x
	86-L2	76:35
	87-L3	76:35
	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

Specimen 17: cable NHXH 4x1,5 RE FE180 PH90/E90
Specimen 18: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 19: cables NHXH 4x1,5 RE FE180 PH30/E30
Specimen 20: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30
Specimen 21: cables NHXH 4x50 RM FE180 PH30/E30
Specimen 22: cables NHXCH 4x50/25 RM FE180 PH30/E30
Specimen 23: cable NHXH 4x1,5 RE FE180 PH90/E90
Specimen 24: cable NHXH 4x50 RM FE180 PH90/E90

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

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

Measured time of tested specimens from S25 to S32

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
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-	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
S31	121-L1	no failure / interruption
	122-L2	no failure / interruption
	123-L3	no failure / interruption
	124-PEN	no failure / interruption
S32	125-L1	no failure / interruption
	126-L2	no failure / interruption
	127-L3	no failure / interruption
	128-PEN	no failure / interruption

Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 26: cable NHXCH 4x16/16 RE FE180 PH90/E90
Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 28: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 29: cable NHXH 4x1,5 RE FE180 PH90/E90
Specimen 30: cable NHXH 4x50 RM FE180 PH90/E90
Specimen 31: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 32: cable NHXH 4x50 RM FE180 PH90/E90

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

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

Measured time of tested specimens from S33 to S40

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
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	x
	142-L2	x
	143-L3	48:28
	144-PEN	x
S37	145-L1	x
	146-L2	x
	147-L3	41:22
	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	no failure / interruption
	158-L2	no failure / interruption
	159-L3	no failure / interruption
	160-PEN	no failure / interruption

Specimen 33: cable NHXCH 4x50/25 RM FE180 PH90/E90
Specimen 34: cable NHXH 4x1,5 RE FE180 PH90/E90
Specimen 35: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90
Specimen 36: cables NHXH 4x1,5 RE FE180 PH30/E30
Specimen 37: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30
Specimen 38: cable NHXH 4x50 RM FE180 PH30/E30
Specimen 39: cable NHXCH 4x50/25 RM FE180 PH30/E30
Specimen 40: cable NHXH 4x50 RM FE180 PH30/E30

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 S47

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
S46	181-L1	no failure / interruption
	182-L2	-
	183-L3	-
	184-PEN	-
S47	185-L1	no failure / interruption
	186-L2	no failure / interruption
	187-L3	no failure / interruption
	188-PEN	no failure / interruption

Specimen 41: cable NHXCH 4x50/25 RM FE180 PH30/E30
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Specimen 46: cable NHXH 1x35 RM FE180 PH90/E90 with joint SMH1
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Specimen 47: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4
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- 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 S59

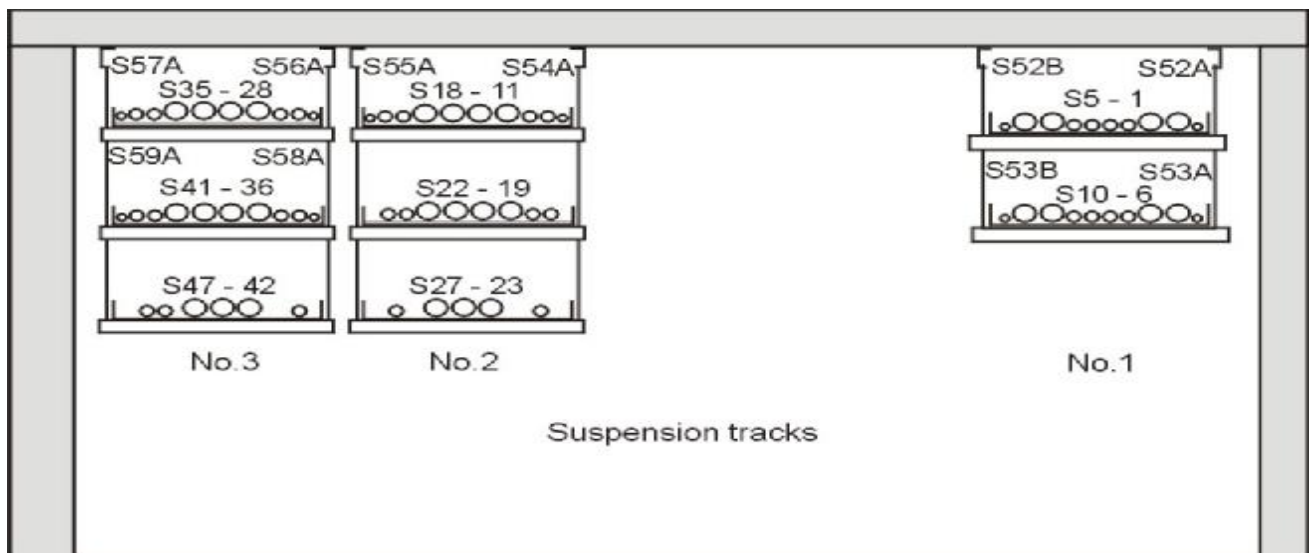
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	x
	210-PEN	86:52
S52B	211-L	x
	212-PEN	82:51
S53A	213-L	x
	214-PEN	73:22
S53B	215-L	54:36
	216-PEN	x
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S55A	221-L	no failure / interruption
	222-PEN	no failure / interruption
S56A	225-L	no failure / interruption
	226-PEN	no failure / interruption
S57A	229-L	no failure / interruption
	230-PEN	no failure / interruption
S58A	233-L	no failure / interruption
	234-PEN	no failure / interruption
S59A	237-L	52:43
	238-PEN	x

Specimens 52, 53: cables HTKSHekw 1x2x1,0 FE180 PH90/E30-E90
Specimens 54, 55: cables HTKSHekw 1x2x1,0 FE180 PH90/E30-E90
Specimens 56, 57: cables HTKSH 1x2x1,0 FE180 PH90/E30-E90
Specimens 58, 59: cables HTKSH 1x2x1,0 FE180 PH90/E30-E90

- 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 / 0,3W.
Circuit breakers with rating 3 A were used.

Layout of cables in the test furnace

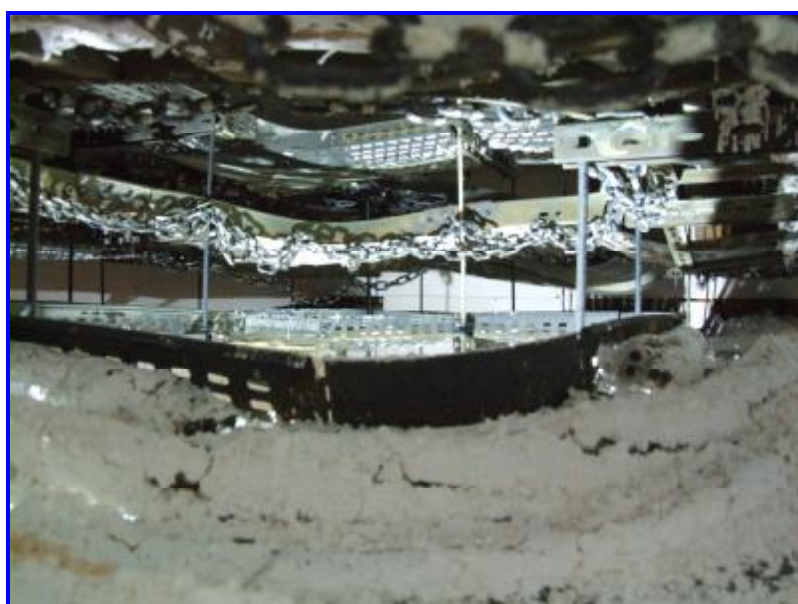


Specimen 1: cables NHXH 4x50 RM FE180 PH30/E30	Specimens placed in the wire trays KDSO 400H60/3E (BAKS) Suspension track No.1
Specimens 2, 5: cables NHXCH 4x50/25 RM FE180 PH90/E90	
Specimen 3: cables NHXH 4x1,5 RE FE180 PH30/E30	
Specimen 4: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimens 52: cables HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	
Specimens 6, 10: cables NHXH 4x50 RM FE180 PH30/E30	Specimens placed in the wire trays KDSO 400H60/3N (BAKS) Suspension track No.1
Specimen 7: cables NHXH 4x50 RM FE180 PH90/E90	
Specimen 8: cables NHXH 4x1,5 RE FE180 PH30/E30	
Specimen 9: cables NHXH 4x1,5 RE FE180 PH90/E90	
Specimens 53: cables HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	
Specimens 11, 17: cables NHXH 4x1,5 RE FE180 PH90/E90	Specimens placed in the cable trays KCOP 400H60/3N (BAKS). Suspension track No.2
Specimens 12, 18: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimens 13, 15: cables NHXH 4x50 RM FE180 PH90/E90	
Specimens 14, 16: cables NHXCH 4x50/25 RM FE180 PH90/E90	
Specimens 54, 55: cables HTKSHekw 1x2x1,0 FE180 PH90/E30-E90	
Specimen 19: cables NHXH 4x1,5 RE FE180 PH30/E30	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.2
Specimen 20: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30	
Specimen 21: cables NHXH 4x50 RM FE180 PH30/E30	
Specimen 22: cables NHXCH 4x50/25 RM FE180 PH30/E30	
Specimen 23: cable NHXH 4x1,5 RE FE180 PH90/E90	
Specimen 24: cable NHXH 4x50 RM FE180 PH90/E90	Specimens placed in the cable trays KCOP 400H60/3N (BAKS). Suspension track No.2
Specimen 25: cable NHXCH 4x50/25 RM FE180 PH90/E90	
Specimen 26: cable NHXCH 4x16/16 RE FE180 PH90/E90	
Specimen 27: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimens 28, 35: cables NHXCH 4x1,5/1,5 RE FE180 PH90/E90	
Specimens 29, 34: cables NHXH 4x1,5 RE FE180 PH90/E90	Specimens placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3
Specimens 30, 32: cables NHXH 4x50 RM FE180 PH90/E90	
Specimens 31, 33: cables NHXCH 4x50/25 RM FE180 PH90/E90	
Specimens 56, 57: cables HTKSH 1x2x1,0 FE180 PH90/E30-E90	
Specimen 36: cables NHXH 4x1,5 RE FE180 PH30/E30	
Specimen 37: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30	Specimens placed in the cable trays KCOP 400H60/3N (BAKS). Suspension track No.3
Specimens 38, 40: cables NHXH 4x50 RM FE180 PH30/E30	
Specimens 39, 41: cables NHXCH 4x50/25 RM FE180 PH30/E30	
Specimens 58, 59: cables HTKSH 1x2x1,0 FE180 PH90/E30-E90	
Specimen 46: cable NHXH 1x35 RM FE180 PH90/E90 with joint SMH1	
Specimen 47: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4	Specimens placed in the cable trays KCOP 400H60/3N (BAKS) with cable joint busines CELLPACK Suspension track No.3

Photos taken before the test



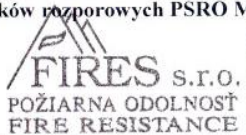
Photos taken after the termination of the test



Badanie trasy kablowej TECHNOKABEL - BAKS

Badanie w FIRES Słowacja Data 18.09.2008

Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
1	57A		HTKSH 1x2x1	1	Drabinka kablowa DGOP 400H60/... Łuk drabiny LDOP 400H60, Trójkąt drabiny TDOP 400H60, B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków rozporowych PSRO M10x 80
2	35		NHXCH FE 180 E90 4x 1,5/1,5		
3	34		NHXH FE 180 E90 4x 1,5		
4	33		NHXCH FE 180 E90 4x 50/25		
5	32		NHXH FE 180 E90 4x 50		
6	31		NHXCH FE 180 E90 4x 50/25		
7	30		NHXH FE 180 E90 4x 50		
8	29		NHXH FE 180 E90 4x 1,5		
9	28		NHXCH FE 180 E90 4x 1,5/1,5		
10	56A		HTKSH 1x2x1		
11	59A		HTKSH 1x2x1	2	Korytka kablowe KCOP 400H60/... Kolanko korytka KPPOP 400H60 Trójkąt korytka TKPOP 400H60. B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków rozporowych PSRO M10x 80
12	37		NHXCH FE 180 E30 4x 1,5/1,5		
13	36		NHXH FE 180 E30 4x 1,5		
14	41		NHXCH FE 180 E30 4x 50/25		
15	40		NHXH FE 180 E30 4x 50		
16	39		NHXCH FE 180 E30 4x 50/25		
17	38		NHXH FE 180 E30 4x 50		
18	37		NHXCH FE 180 E30 4x 1,5/1,5		
19	36		NHXH FE 180 E30 4x 1,5		
20	58A		HTKSH 1x2x1		
21	47		NHXCH FE 180 E90 4x1,5/1,5 + SMH4	3	Korytka kablowe KCOP 400H60/... Kolanko korytka KPPOP 400H60 Trójkąt korytka TKPOP 400H60. B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków rozporowych PSRO M10x 80 Kable montowane z mufami firmy CELLPACK.
22	46		NHXH FE 180 E90 1x 35 + SMH1		
23	45		NHXH FE 180 E90 1x 240 + SMH1		
24	44		NHXCH FE 180 E90 4x 50/25 + SMH4		
25	43		NHXH FE 180 E90 4x 50 + SMH4		
26	42		NHXCH FE 180 E90 4x 1,5 + SMH4		
27	55A		HTKSHekw 1x2x1	4	Korytka kablowe KCOP 400H60/... Kolanko korytka KPPOP 400H60 Trójkąt korytka TKPOP 400H60. B-400 1.2 m /10kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków rozporowych PSRO M10x 80
28	18		NHXCH FE 180 E90 4x 1,5/1,5		
29	17		NHXH FE 180 E90 4x 1,5		
30	16		NHXCH FE 180 E90 4x 50/25		
31	15		NHXH FE 180 E90 4x 50		
32	14		NHXCH FE 180 E90 4x 50/25		
33	13		NHXH FE 180 E90 4x 50		
34	12		NHXCH FE 180 E90 4x 1,5/1,5		
35	11		NHXH FE 180 E90 4x 1,5		
36	54A		HTKSHekw 1x2x1		
37	20		NHXCH FE 180 E30 4x 1,5/1,5	5	Drabinka kablowa DGOP 400H60/... Łuk drabiny LDOP 400H60, Trójkąt drabiny TDOP 400H60, B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków rozporowych PSRO M10x 80
38	19		NHXH FE 180 E30 4x 1,5		
39	22		NHXCH FE 180 E30 4x 50/25		
40	21		NHXH FE 180 E30 4x 50		
41	22		NHXCH FE 180 E30 4x 50/25		
42	21		NHXH FE 180 E30 4x 50		
43	20		NHXCH FE 180 E30 4x 1,5/1,5		
44	19		NHXH FE 180 E30 4x 1,5		

	Datum/Date 18.09.2008 Podpis/Signature 
Dokument č. / Document No. FIRES-FR-198-08-AUWE	
Príloha č. / Attachment No. 13	

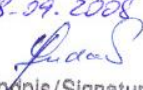
Nr	Nr FIRES	Czas	Symbol kaba	Pozycja	Konstrukcja mocowania, odległość, obciążenie
45	27		NHXCH FE 180 E90 4x 1,5/1,5	6	Korytka kablowe KCOP 400H60/... Kolanko korytka KPPOP 400H60 Trójkąt korytka TKPOP 400H60. B-400 1.2 m / 10kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kolców rozporowych PSRO M10x 80
46	26		NHXCH FE 180 E90 4x 16/16		
47	25		NHXCH FE 180 E90 4x 50/25		
48	24		NHXH FE 180 E90 4x 50		
49	23		NHXH FE 180 E90 4x 1,5		
50	52B		HTKSHekw 1x2x1	7	Korytka siatkowe kwasoodporne KDS 400H60/... E, B-400/ 1.5 m / 20kg/m / Øpręta 4,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kolców rozporowych PSRO M10x 80
51	1		NHXH FE 180 E30 4x 50		
52	5		NHXCH FE 180 E90 4x 50/25		
53	3		NHXH FE 180 E30 4x 1,5		
54	4		NHXCH FE 180 E90 4x 1,5/1,5		
55	4		NHXCH FE 180 E90 4x 1,5/1,5		
56	3		NHXH FE 180 E30 4x 1,5		
57	2		NHXCH FE 180 E90 4x 50/25		
58	1		NHXH FE 180 E30 4x 50		
59	52A		HTKSHekw 1x2x1		
60	53B		HTKSHekw 1x2x1	8	Korytka siatkowe zwykłe KDS 400H60/... , B-400/ 1.5 m / 20kg/m / Øpręta 4,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kolców rozporowych PSRO M10x 80
61	10		NHXH FE 180 E30 4x 50		
62	7		NHXH FE 180 E90 4x 50		
63	8		NHXH FE 180 E30 4x 1,5		
64	9		NHXH FE 180 E90 4x 1,5		
65	9		NHXH FE 180 E90 4x 1,5		
66	8		NHXH FE 180 E30 4x 1,5		
67	7		NHXH FE 180 E90 4x 50		
68	6		NHXH FE 180 E30 4x 50		
69	53A		HTKSHekw 1x2x1		

Zestawienie kabli

Lp	Symbol kaba	Średnica kabla	Ciężar kabla	Ilość
1	NHXH FE 180 PH30/E30 4x 1,5 RE	15 mm	0,31 kg/m	8
2	NHXH FE 180 PH30/E30 4x 50 RM	32 mm	2,60 kg/m	8
3	NHXCH FE 180 PH30/E30 4x 1,5/1,5 RE	16 mm	0,35 kg/m	4
4	NHXCH FE 180 PH30/E30 4x 50/25 RM	35 mm	2,84 kg/m	4
5	NHXH FE 180 PH90/E90 1x35 RM	13 mm	0,45 kg/m	1
6	NHXH FE 180 PH90/E90 1x240 RM	26 mm	2,50 kg/m	1
7	NHXH FE 180 PH90/E90 4x 1,5 RE	16 mm	0,35 kg/m	8
8	NHXH FE 180 PH90/E90 4x 50 RM	33 mm	2,70 kg/m	8
9	NHXCH FE 180 PH90/E90 4x 1,5/1,5 RE	17 mm	0,39 kg/m	8
10	NHXCH FE 180 PH90/E90 4x 16/16 RM	26 mm	1,34 kg/m	1
11	NHXCH FE 180 PH90/E90 4x 50/25 RM	36 mm	2,95 kg/m	8
12	HTKSH FE180 PH90/E30-E90 1x2x1	8 mm	0,07 kg/m	4
13	HTKSH ekw FE180 PH90/E30-E90 1x2x1	8 mm	0,07 kg/m	6

Zestawienie muf kablowych firmy CELLPACK

Lp	Symbol kaba	ilość		
1	SMH1 35-240 E90	2		
2	SMH4 1,5-50 E90	4		

 FIRES S.R.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 18.09.2008
	Podpis/Signature 
Dokument č. Document No. FIRES-FR-798-08-ANWE	
Príloha č./Appendix No. 19	



Straight-through joints

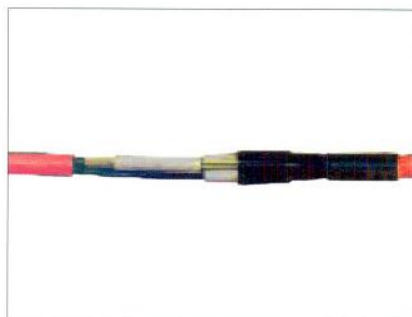
SMH...E90, SMHC...E90

Heat-shrink straight-through joint

for fire-resistant cables

 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 13-09-2008
	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-PR-198-08-RUNE</i>
	Príloha č./Appendix N6. <i>15</i>

Catalogue Low Voltage 2008



For connecting fire-resistant cables, wherever prescribed, e.g. at power plants, chemical plants, public buildings, airports, tunnels, off-shore installations, fire alarm systems, escape ways

Dimensions



Characteristics

- Compact dimensions
- Resistant to chemical agents
- Resistant to alkaline earths
- UV-resistant
- Fire-resistant (see tests)
- Silicone-free
- Halogen-free
- Watertight transversely
- High electrical insulation values
- Low smoke emission

Application

- Indoor
 - Outdoor
 - Underground
 - Water
 - Cable trays
 - Ductwork
- Voltage level LV**
- U_0/U_m (U_m) 0.6/1 (1.2) kV

Scope of delivery

- Inner tubes
- Insulating tubes
- Outer tube
- Cleaning tissue
- Emery cloth
- Working instruction

Note

- without connectors

Tests

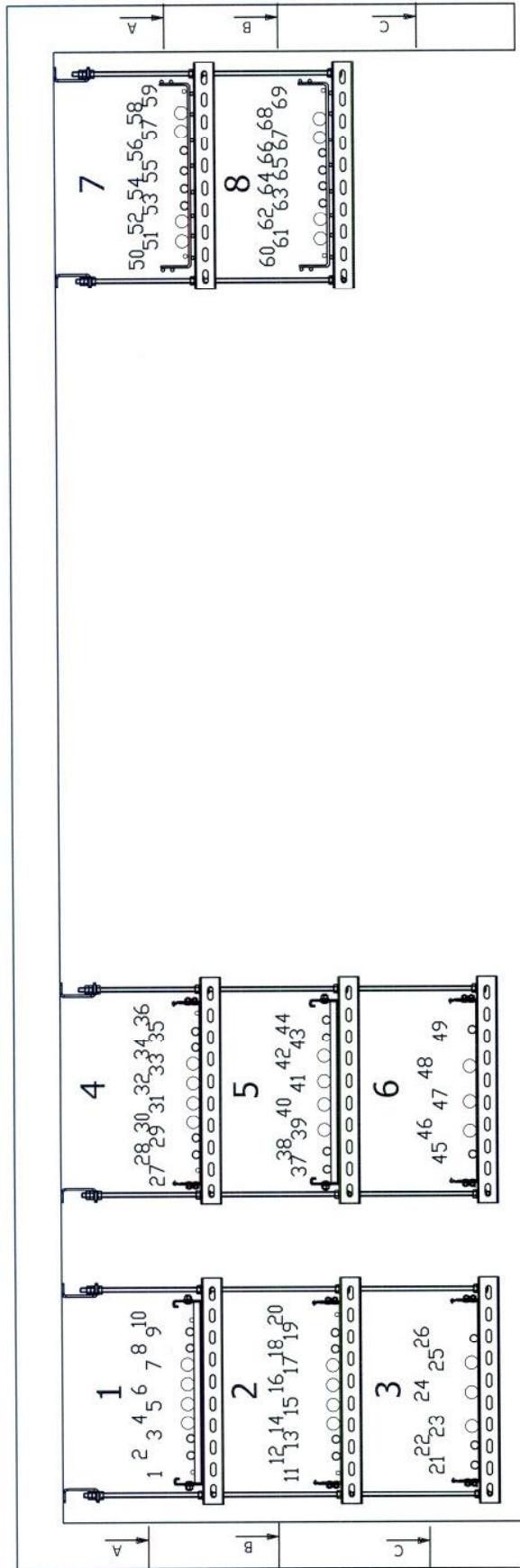
- DIN VDE 0472 part 814 (FE180)
- IEC 331-332
- DIN 4102 part 12, November 1998 (E90)

Storage conditions/Shelf life

- Unlimited shelf life

Type		L1 mm	Polymeric cable		Concentric conductor	Art.-No.
						
			4x	5x	4x	
			Nominal cross section per conductor mm ²			
for energy cables and conductors						
SMH4	1.5-4 E90	350	1.5 – 4			145653
	6-10 E90	380	6 – 10			145655
	16-25 E90	470	16 – 25			145656
	35-50 E90	500	35 – 50			145657
	70-95 E90	600	70 – 95			145659
	120-150 E90	600	120 – 150			145660
	185-240 E90	750	185 – 240			145661
SMH5	1.5-4 E90	350		1.5 – 4		145680
	6-10 E90	380		6 – 10		145681
	16-25 E90	470		16 – 25		145682
for energy cables and conductors with concentric conducteurs						
SMHC4	1.5-4 E90	350			1.5/1.5 – 4/4	145665
	6-10 E90	380			6/6 – 10/10	145666
	16-25 E90	470			16/16 – 25/16	145667
	35-50 E90	500			35/16 – 50/25	145668
	70-95 E90	600			70/35 – 95/50	145669
	120-150 E90	600			120/70 – 150/70	145670
	185-240 E90	750			185/95 – 240/120	145671

Connectors must be ordered separately



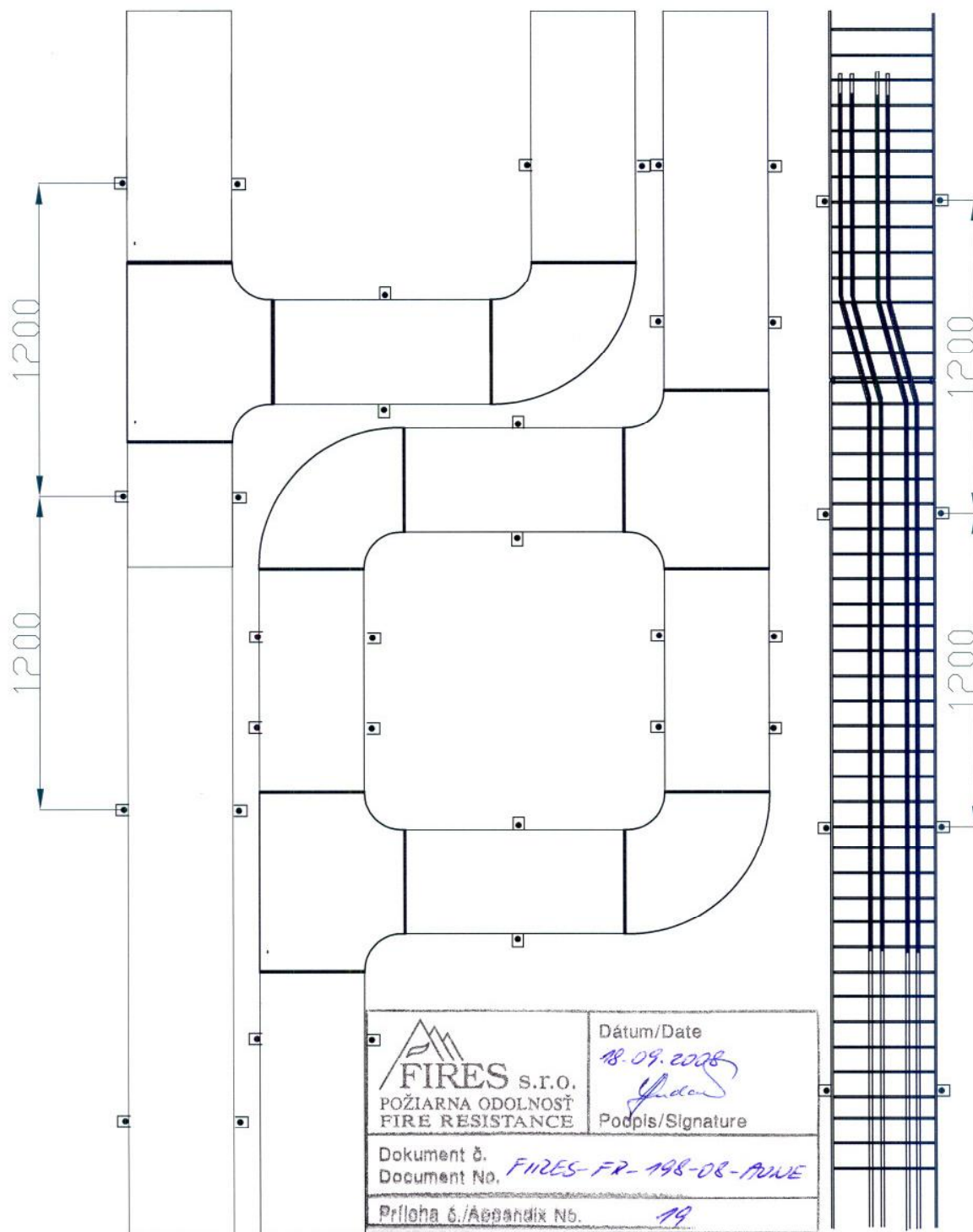
BAKS-TECHNOKABEL
FIRES
15-19,09, 2008rok

 FIRES s.r.o. POZIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18.09.2008
	Podpis/Signature <i>[Signature]</i>
Dokument č. / Document No. FIRES-FR-198-08-AWE	
Príloha č. / Attachment No. 16	

Projektant Byssal	Doklad JMKzak	Dot 05.12.2007	Getunek Nr. nomen poľabrylet (or nomen)	Msza kgj Podzolka	Ornat A4
Spawacz	Podpis				Pruszcz 1
Zakładca					Pruszcz 1
Profesjonalne Systemy Tras Kablowych			Fires 18, 09, 2008		
Nr. programu kaszynowego nr rysunku			Nr. zblony		



	Dochyłka wykurlone nieotworzonych	Materiał	Głównik Nr. normy pol/fabrykat (nr. normy)	PW-EN 10327:2005	Nazwa Tłogi	Podobieństwo	Formet	A4
							Nr.kusz	1
							Nr.kuszy	5
Projektował				Nazwa rysunku				
Rysował	Nazwisko J.Grochowski	Prosta	Data 05-May-06					
Opracował				Nr programu nazwy nowego Nr rysunku				
Zatwierdził							Nr zmiany	
	Profesjonalne Systemy Tras Kablowych			Batizowce 18,09,2008				

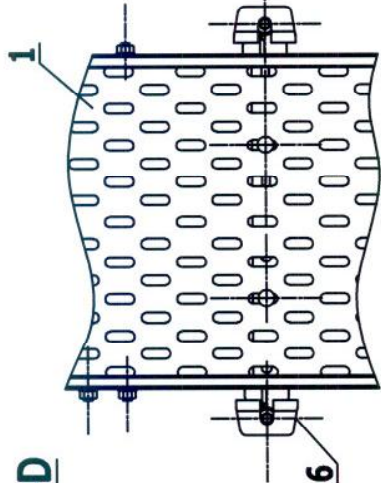
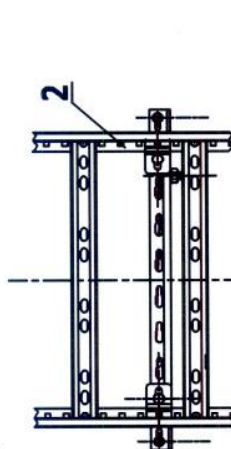


Przekrój C-C

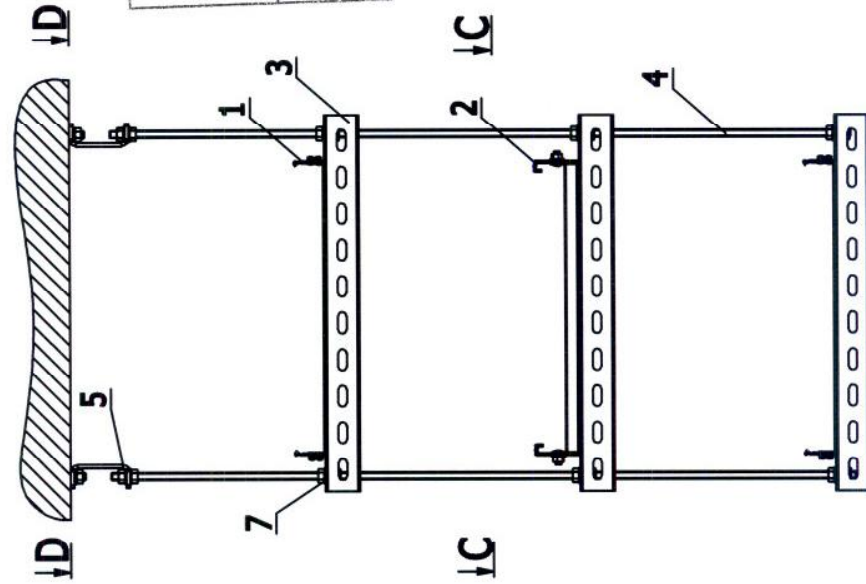
	Oddychała wymiarów nie tolerowanych	Materiał Nr normy PN-EN 13321-2:2005	Masa (kg) Podziałka	Format A4 Kształt Kształty 5
Projektował Rysował Sprawdził Zatwierdził	Nazwisko J. Grochoński Podpis	Data 05-May-06	Nazwa rysunku Nr programu maszynowego Nr rysunku	Nr zmiany
Profesjonalne Systemy Tras Kablowych			Batizowce 18,09,2008	

C-C

D-D

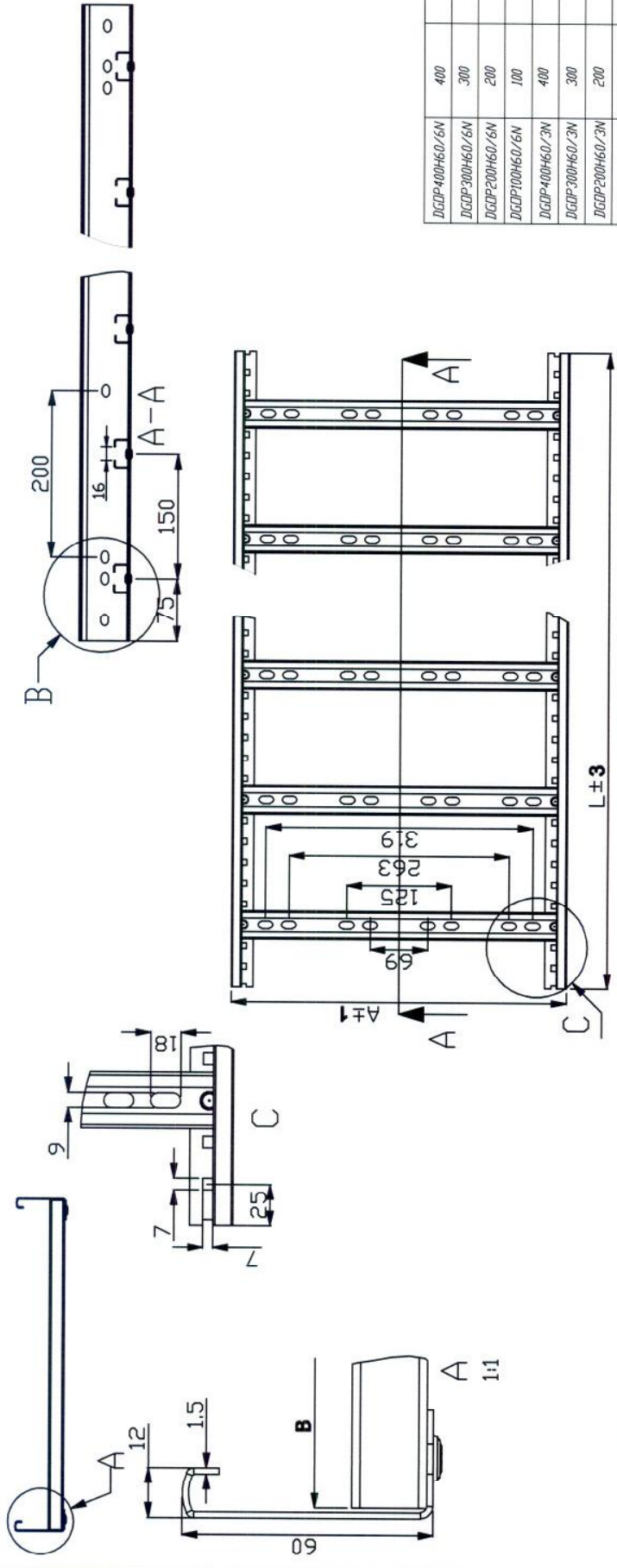


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	podpis/Signature
Dokument č. FIRES-FR-198-08-ANWE Document No.	
Príloha č. 1 k prílohe M6. 20	



8	Sruba	PSRDM10x80	Stal cyklovane galvanizovane	804100
7	Uchyt sufitovy	USDV	Stal cyklovane galvanizovane PH-EN ISO 14620M	803700
6	Nakretka	NS M10	Stal cyklovane galvanizovane	650244
5	Podkladka	PP 10	Stal cyklovane galvanizovane	650544
4	Pret gwhitovany	PCM10/1	Stal cyklovane galvanizovane	651001
3	Cevnik wznocny	CVDP-40H40/05	Stal cyklovane galvanizovane PH-EN ISO 14620M	804105
2	Drabinka	DGDP-400H60/3N	Stal cyklovane galvanizovane PH-EN ISO 14620M	863043
1	Koryto	KCDP-400H60/3N	Stal cyklovane galvanizovane PH-EN ISO 14620M	862040
Pos.	Benennung	Zeichnung-Nr.	Material	Katalogs Nr.
gekonstruierd	ASStationsid	281008		
gezeichnet	ASStationsid	281008		
geprüft				
Masstab				
RINNE KCDP-400H60/3N LETTER DGDP-400H60/3N fire		BAKS DZIAŁ KONSTRUKCYJNY ul. Jagodnie 5 05-480 Karaczew		
This drawing and its contents is the property of the BAKS company and may not be copied or otherwise disclosed to any third party without our consent. Considerations will be prosecuted.		Blatt 1 von 1 Grosse A3 Name Feuerbestandig System Vorhaben für		

This drawing and its contents is the property of the BAKS company and may not be copied or otherwise disclosed to any third party without our consent. Considerations will be prosecuted.

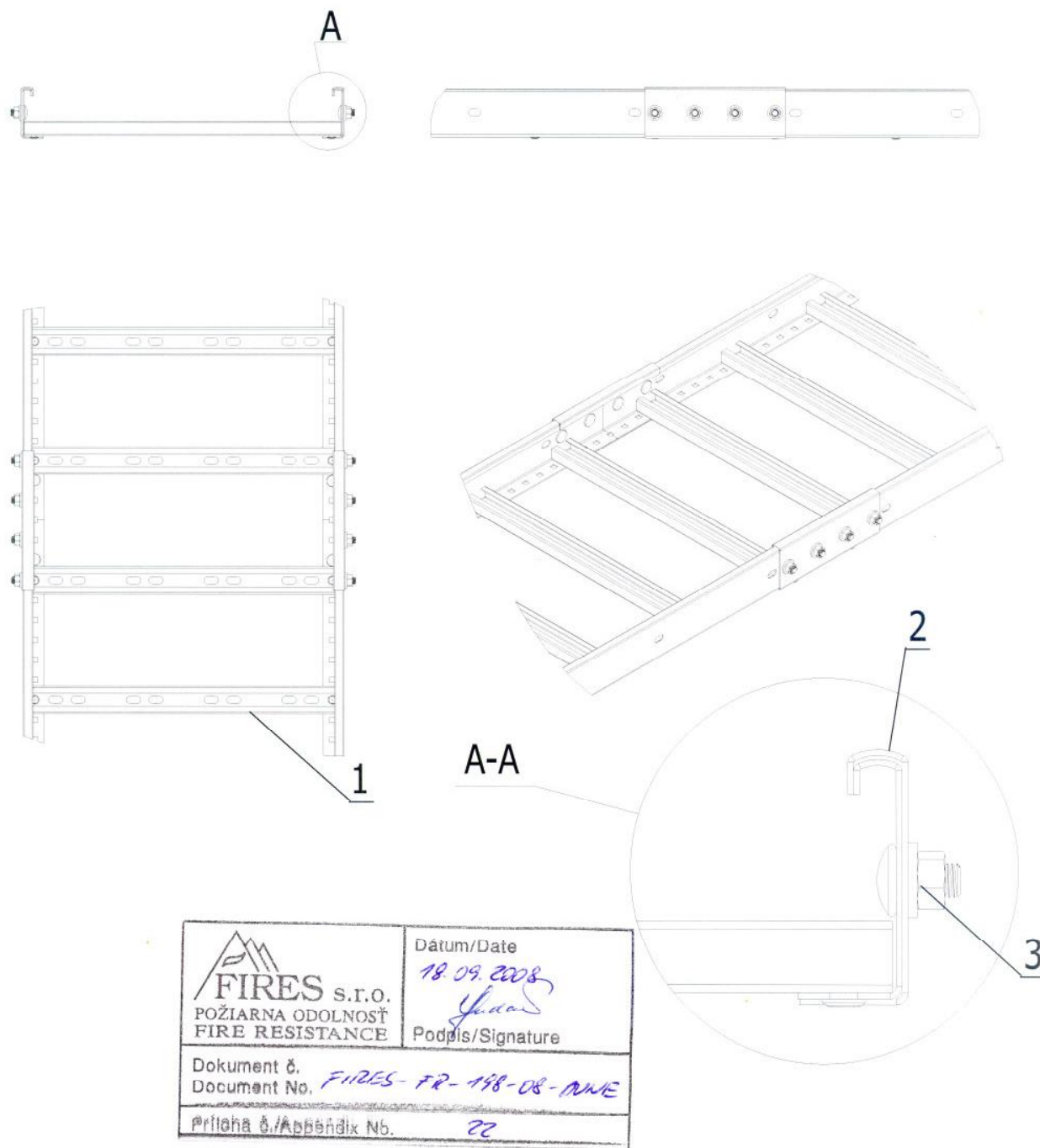


FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18.09.2008
	Podpis/Signature <i>[Signature]</i>
Dokument č. FIRE-198-08-AWE Document No.	
Príloha č. 1 k projektu Attachment No.	

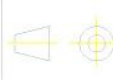
Projektovateľ Projekt Správca Stavebník	Dĺžka výška Dĺžka výška Dĺžka výška Dĺžka výška	Grube (mm) 1,5	Typ DGP400H60/3N	Šírka 400	Dĺžka 6000	Typ DGP400H60/3N	Šírka 400	Dĺžka 6000
Projektovateľ Projekt Správca Stavebník	Dĺžka výška Dĺžka výška Dĺžka výška Dĺžka výška	Grube (mm) 1,5	Typ DGP400H60/3N	Šírka 400	Dĺžka 6000	Typ DGP400H60/3N	Šírka 400	Dĺžka 6000

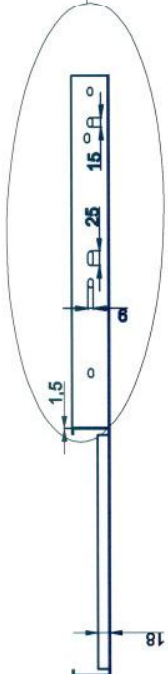
DGP400H60/6N	400	6000	863040
DGP300H60/6N	300	6000	863030
DGP200H60/6N	200	6000	863020
DGP100H60/6N	100	6000	863010
DGP400H60/3N	400	3000	863043
DGP300H60/3N	300	3000	863033
DGP200H60/3N	200	3000	863023
DGP100H60/3N	100	3000	863013

Profesionalne Systémy Tras Kablových

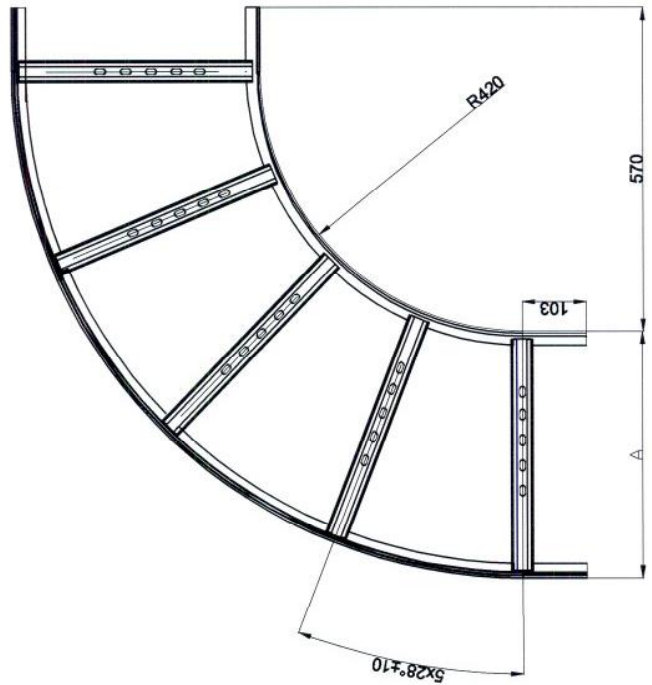


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	Podpis/Signature
Dokument č. Document No. <i>FIRES-FR-198-08-NWE</i>	
Příloha č./Appendix No. <i>??</i>	

3	śruba	SGN M8x14	Stal cynkowana galwanicznie	8	650142
2	łącznik	LD0CH60N	PN-EN 10327:2005	2	863000
1	DRABINKA	DGDP400H60/3N	PN-EN 10327:2005	1	863043
Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
		Material		Masa [kg]	Podziałka
Odczytywa wyników nieolerowanych		Gatunek Nr normy półfabrykat (nr normy)		PN-EN 10327:2005	1:200
Projektował		Nazwa rysunku		Format: A4	
Rysował		Data		Arkusz: 1	
Sprawdził		21-Nov-06		Arkuszy: 1	
Zatwierdził		Nr programu maszynowego Nr rysunku		Nr zmiany	
Profesjonalne Systemy Tras Kablowych					



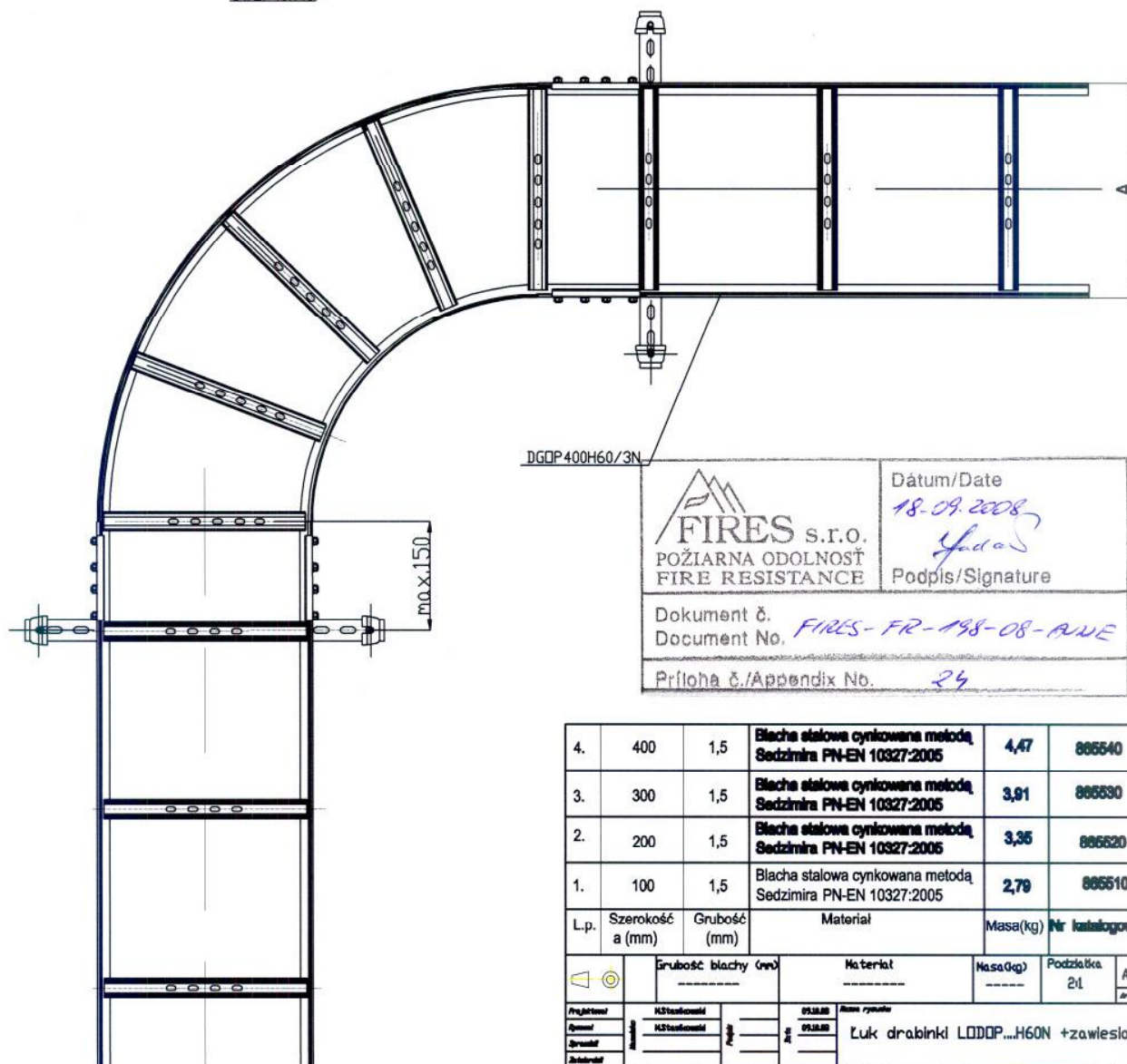
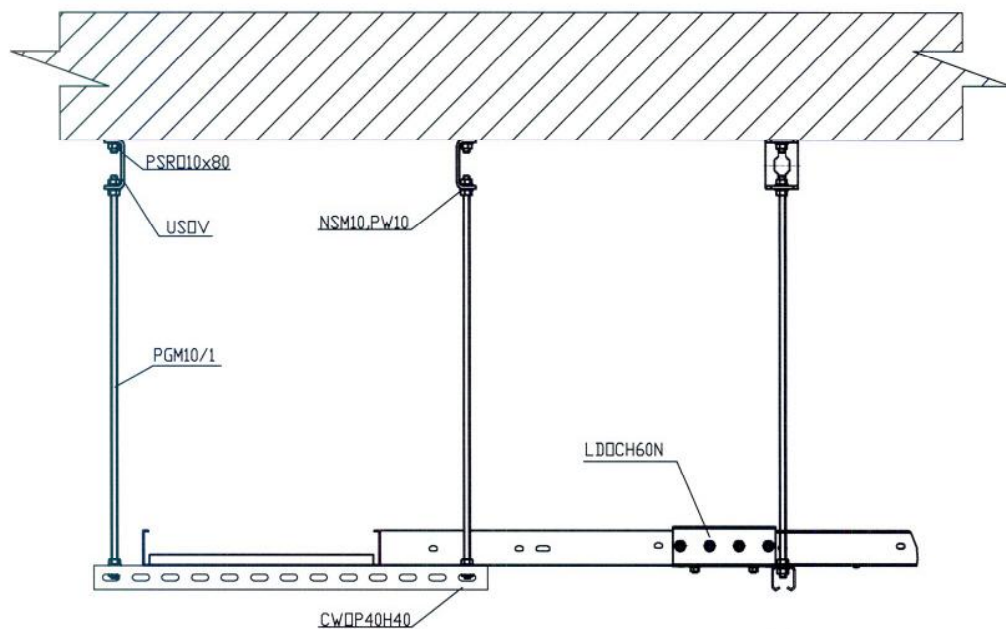
A-A



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	Podpis/Signature <i>[Signature]</i>
Dokument č. <i>FIRE-FR-198-08-ANF</i> Document No.	
Príloha č./Appendix No. <i>23</i>	

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	4,47	865540
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	3,91	865530
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	3,35	865520
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	2,79	865510
L.p.	Szerokość A (mm)	Grubość (mm)	Materiał (mm)	Masa(kg)	Nr katalogu
		Grubość (mm)	Materiał (mm)	Masa(kg)	Podziałka 1:1
Długość wymiarów technicznych		091008 091008 091008	Nazwa rys. Łuk drabinki 90° LDOP...H60 N		
Projektant M. Stawikowski		Wykonanie M. Stawikowski	Zaprojektował M. Stawikowski		
Sprawił M. Stawikowski		Zaświadczył M. Stawikowski			
Profesjonalne Systemy Kablowych			8655....		

Profesjonalne Systemy
Tras Kabinowych



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POŽIARNÁ ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date

18.09.2008

Podpis/Signature

Dokument č.

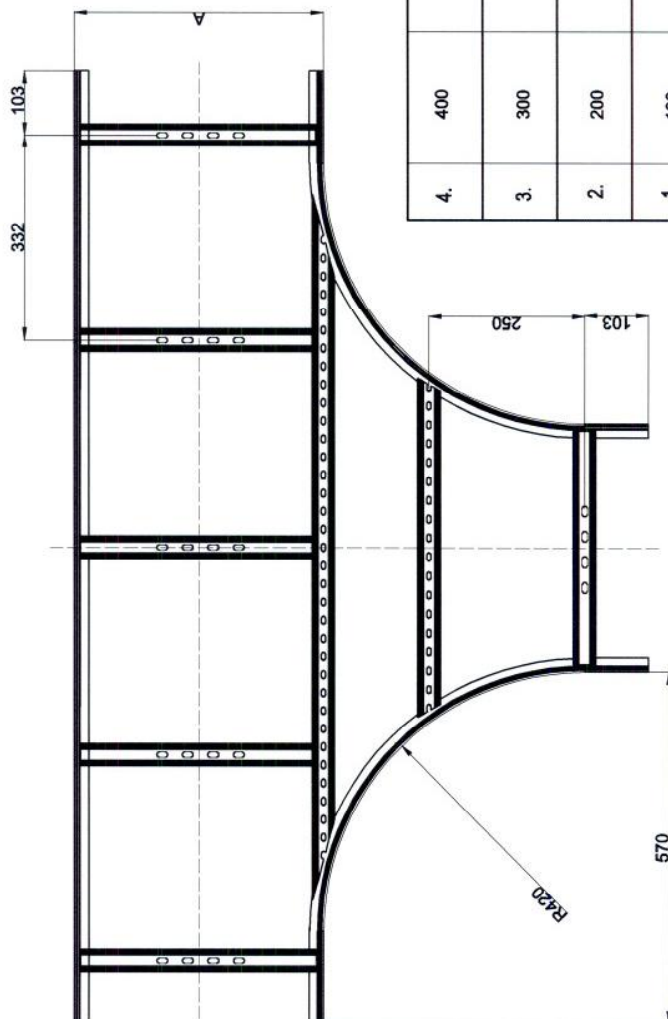
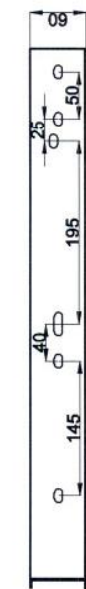
Document No. FIRES-FR-198-08-RWE

Príloha č./Appendix No.

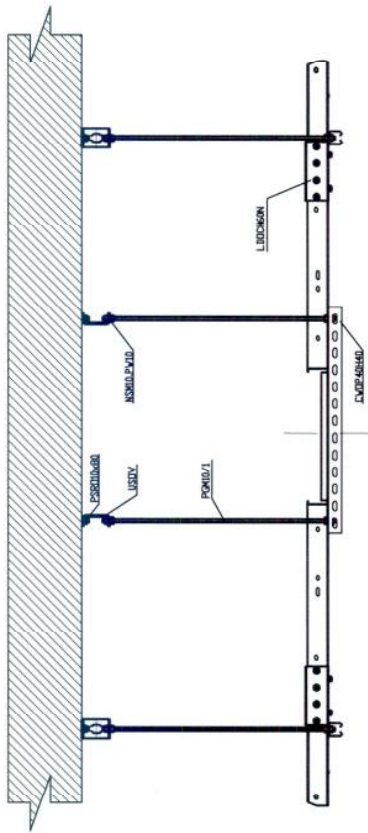
24

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	4,47	865540
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	3,91	865530
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	3,35	865520
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	2,79	865510
Lp.	Szerokość a (mm)	Grubość (mm)	Material	Masa(kg)	Nr katalogowy
Grubość blachy (mm)			Material	Masa(kg)	Podziałka 2x1
-----			-----	-----	A4
Projektant	NSIstancowicki	09.10.08	Rozm. rysunku		
Opis	NSIstancowicki	09.10.08	Łuk drabinki LDQDP...H60N +zawieszka		
Wykonanie					
Rehabilitacja					
Profesjonalne Systemy Tras Kabinowych			8655....		

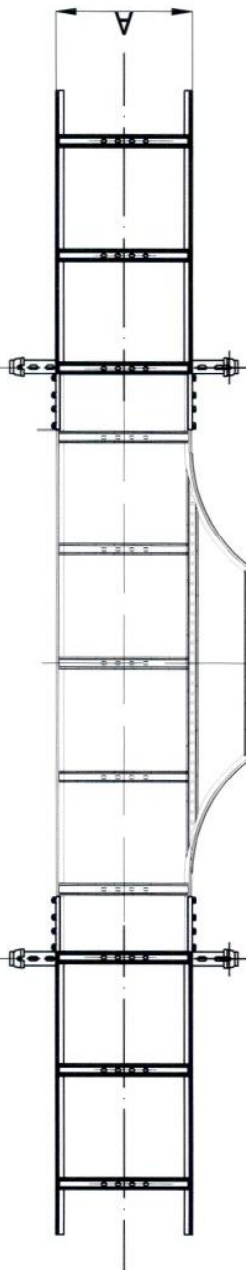
A-A



4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	6,75	885640
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	6,02	885630
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	5,29	885620
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	4,56	885610
L.p.	Szerokość A (mm)	Grubość (mm)	Materiał (mm)	Masa(kg)	Nr katalogu
		Grubość (mm)	Materiał (mm)	Masa(kg)	Proszotka
Projektor	M.S.Ławickowski	—	—	—	1:1
Rysunek	M.S.Ławickowski	09.10.08	09.10.08	—	—
Opis	—	—	—	—	—
Zm. i data	—	—	—	—	—
Profesjonalne Systemy Tras Kablowych					8656...



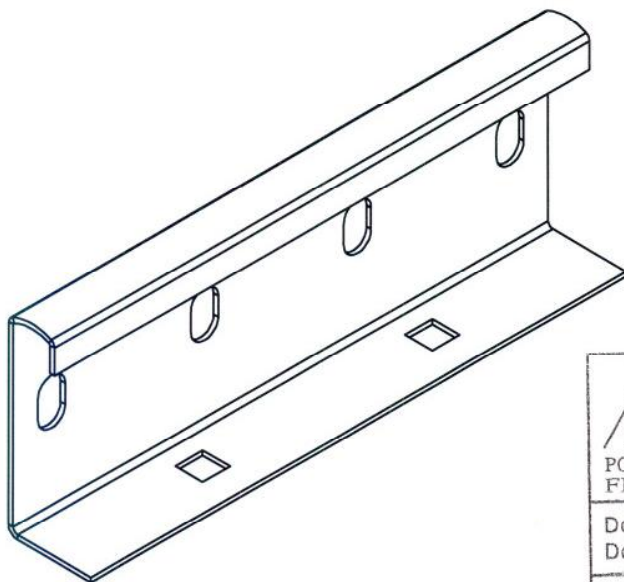
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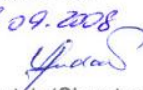


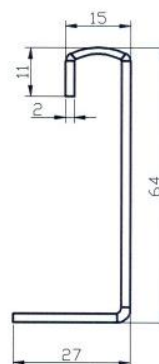
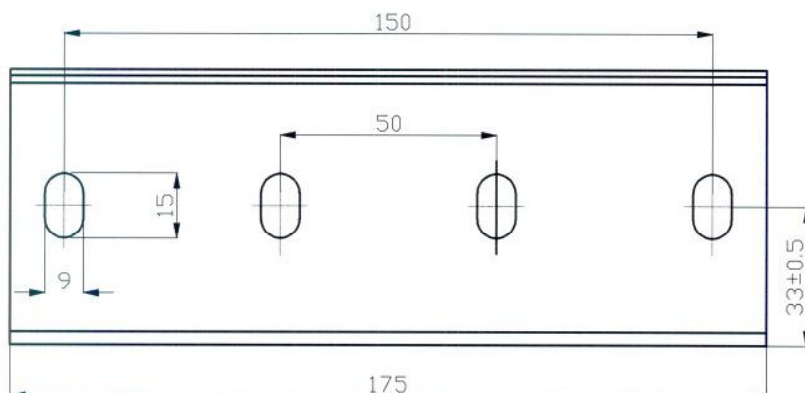
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	Podpis/Signature <i>[Signature]</i>
Dokument č. FIRES-FR-198-08-AVE	
Document No.	
Priloha č./Appendix No. 26	

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzinia PN-EN 10327:2005	0,75	885540
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzinia PN-EN 10327:2005	0,02	885530
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzinia PN-EN 10327:2005	5,29	885520
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzinia PN-EN 10327:2005	4,56	885510
L.p.	Szerokość a (mm)	Grubość (mm)	Material	Masa(kg)	Nr katalogowy
Pos.	Benennung	Zeichnung-Nr	Material	Stück	Katalogs Nr.
główny	M. Stowikowski	08.10.2008			
projekt					
oprac.					
3:1	Trójnik drabinki TDOP...H80		BAKS		
	+zwiesia		DZIAŁ KONSTRUKCYJNY		
			ul. Jagińska 5 05-480		
			Karczew		
			Kurtz		

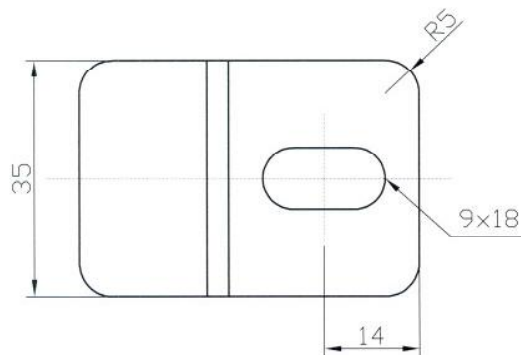
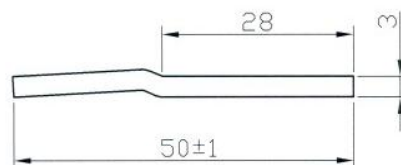
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	Podpis/Signature 
Dokument č. Document No. <i>FIRES-FR-198-08-PWZ</i>	
Príloha č./Appendix No. <i>2x</i>	



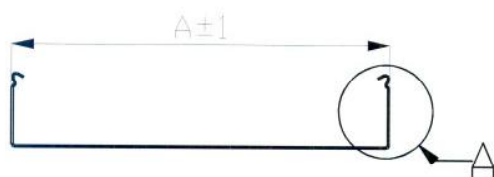
	Odczytywa wyniarów nie tolerowanych	Nazwa J.GROCHOWSKI J.Grochowski T.WŁODARCZYK J.KLICZEK	Podpis 	Materiał Gatunek Nr normy półfabrykat (nr normy)	Blachstalcynknet.Senzinina	Masa (kg) 	Podziałka 	Format A4 Arkusz Arkuszy									
					PN-EN 10327:2005												
Projektował Rysował Sprawdził Zatwierdził	Nazwa rysunku L.DONCH60	Data 20.10.05 20.10.05 20.10.05 20.10.05															
Profesjonalne Systemy Tras Kablowych					Nr rysunku 863000	Nr zmiany <table border="1" data-bbox="1268 1915 1380 1982"> <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>											



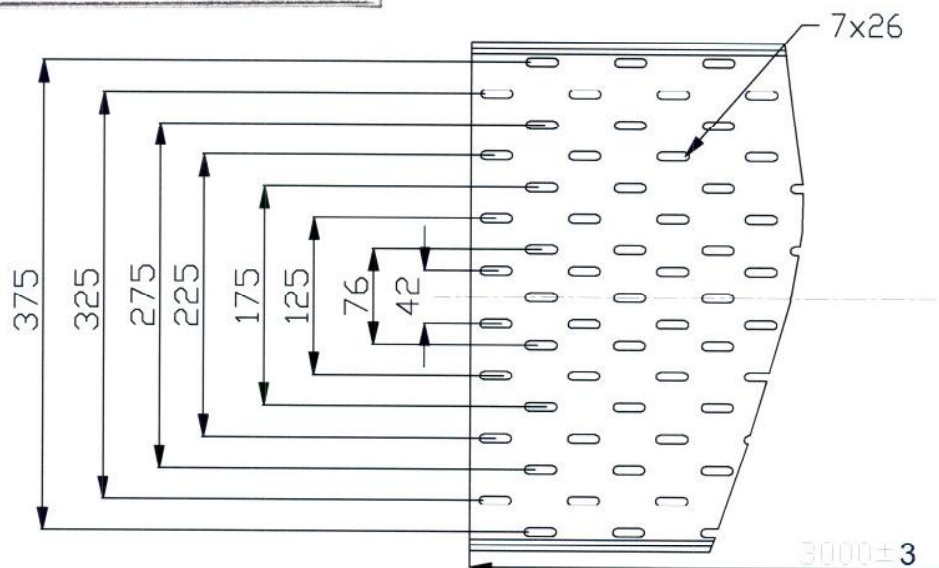
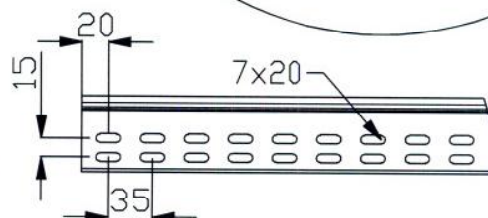
 FIRES s.r.o. POŽIARNÁ ODOLNOSŤ FIRE RESISTANCE	Dátum/Date <i>18.03.2008</i>
	Podpis/Signature <i>Judáš</i>
Dokument č. <i>FIRES-FR-158-08-ANNE</i> Document No.	
Príloha č./Appendix No. <i>28</i>	

	Odchylka výmiarů netolerovaných	$\pm 0,5$	Materiál Gatunek ----- Nr normy PN-EN 10327:2005 półfabrykat (nr normy) -----	Masa [kg] 0,04	Podziółka 1:1	Format A4									
						Arkusz --									
Projektował	Tomasz Grudniewski	Podpis _____ _____ _____	29.12.04	Nazwa rysunku ZMOE											
Rysował	Jakub Rudak		20.02.08												
Sprawdził	Jacek Kliczek		20.02.08												
Zatwierdził	Jacek Kliczek		20.02.08												
 Profesjonalne Systemy Tras Kablowych			Nr rysunku	802900											
				Nr ziany <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>											

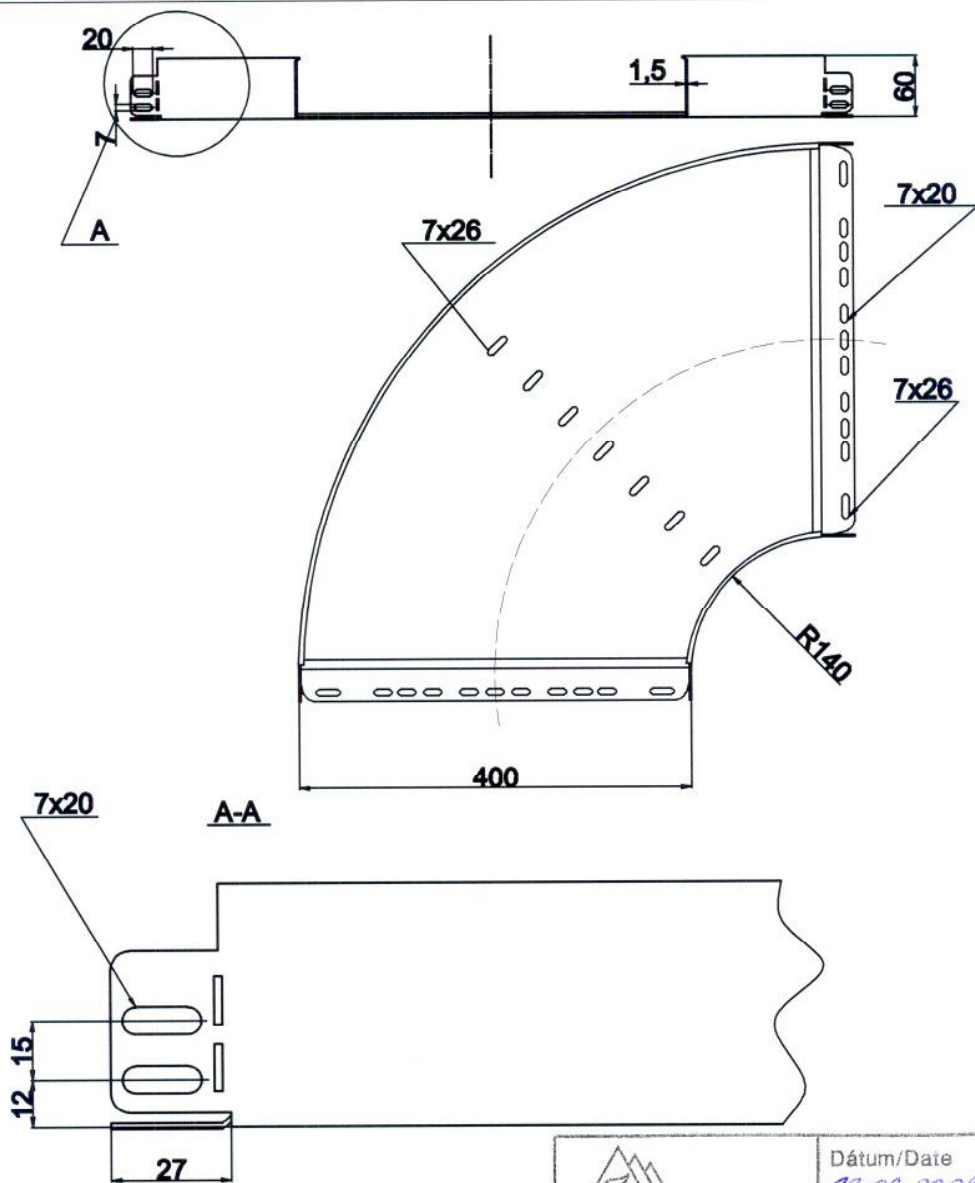
Typ	Szerokość A(mm)	Długość L(mm)	Nr.kat
KCDP100H60/3N	100	3000	862010
KCDP200H60/3N	200	3000	862020
KCDP300H60/3N	300	3000	862030
KCDP400H60/3N	400	3000	862040



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	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-FR-198-08-PUNE</i>
Príloha č./Appendix No. <i>29</i>	

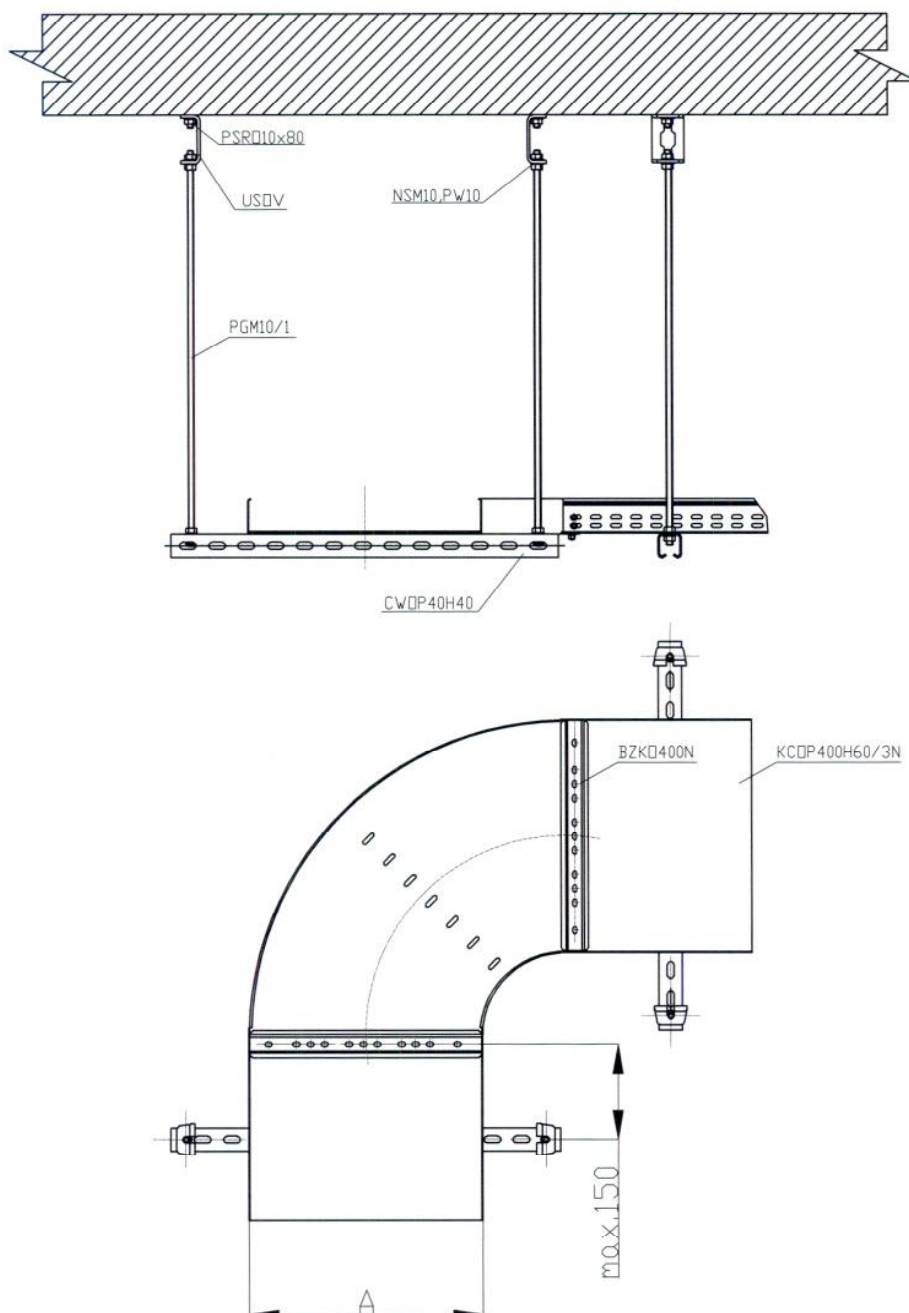


	Odchyłka wyniarów nietolerowanych		Materiał Gatunek Nr normy półfabrykat (nr normy)	PN-EN 10142 + A1 : 1997	Masa [kg]	Podziałka	Format A4
							Arkusz
Projektował	J.GROCHOWSKI	Podpis	Data	20.10.05	Nazwa rysunku <i>KCDP...H60/3N</i>		
Rysował	J.Grochowski		Data	20.10.05			
Sprawdził	T.WŁODARCZYK		Data	20.10.05			
Zatwierdził	J.KLICZEK		Data	20.10.05			
Profesjonalne Systemy Tras Kablowych			Nr programu maszynowego <i>862040</i>			Nr zmiany	



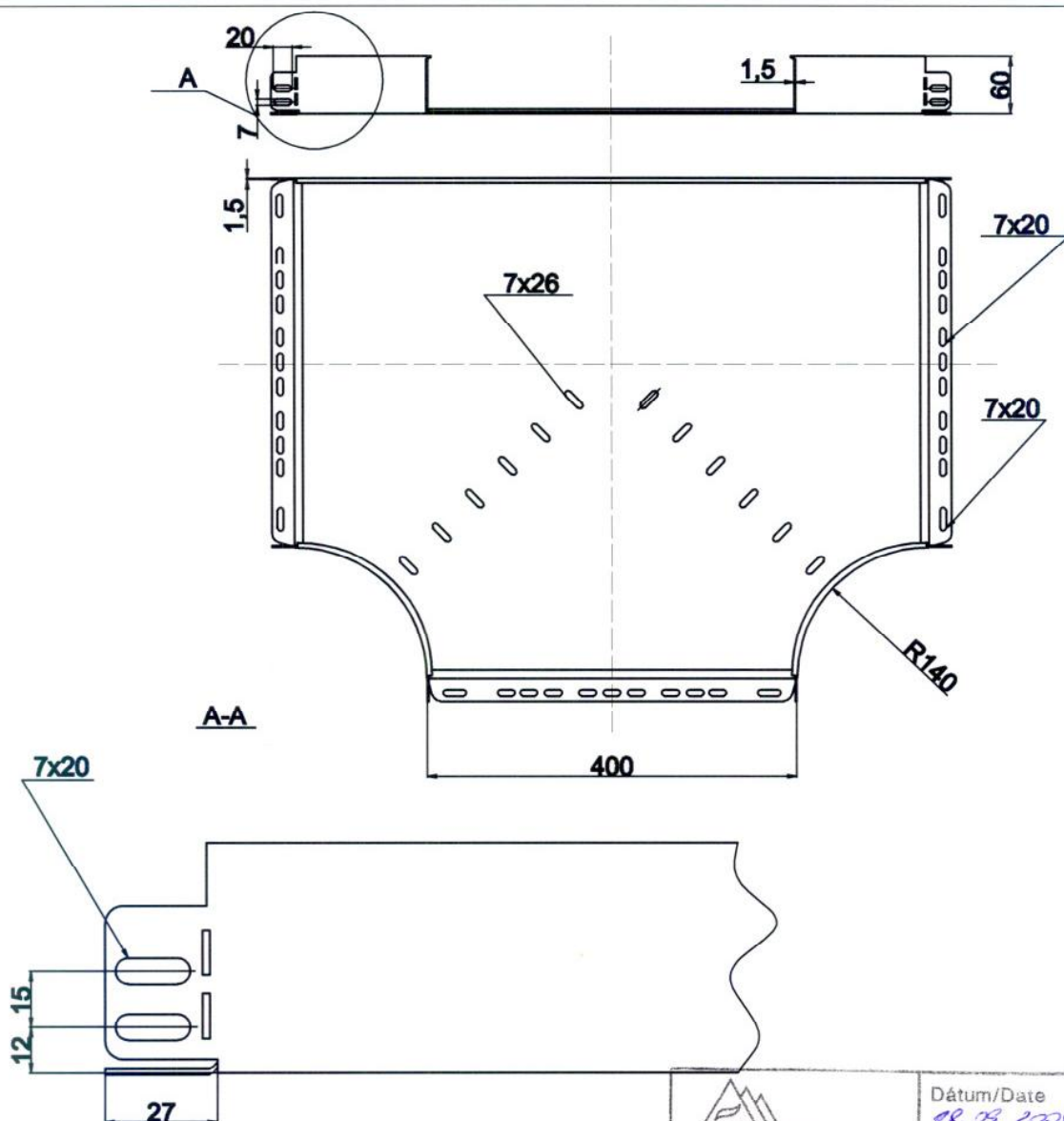
 FIRES S.R.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 18.09.2023
	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-FR-198-08-AWE</i>
Príloha č./Appendix No. <i>39</i>	

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	3,44	865040									
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	2,48	865030									
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	1,60	865020									
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimir PN-EN 10327:2005	0,90	865010									
L.p.	Szerokość a (mm)	Grubość (mm)	Material (mm)	Masa (kg)	Nr katalogu									
	Grubość blachy (mm) —		Material —	Masa (kg) —	Podziałka 1:1									
Projektant	M. Stawikowski	Podpis	09.10.08	Kolanko korytka KKPOP...H60										
Rysował	M. Stawikowski		09.10.08											
Sprawdził														
Zaświadczył														
Profesjonalne Systemy Tras Kablowych			Nr katalogu 8650....	<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>										



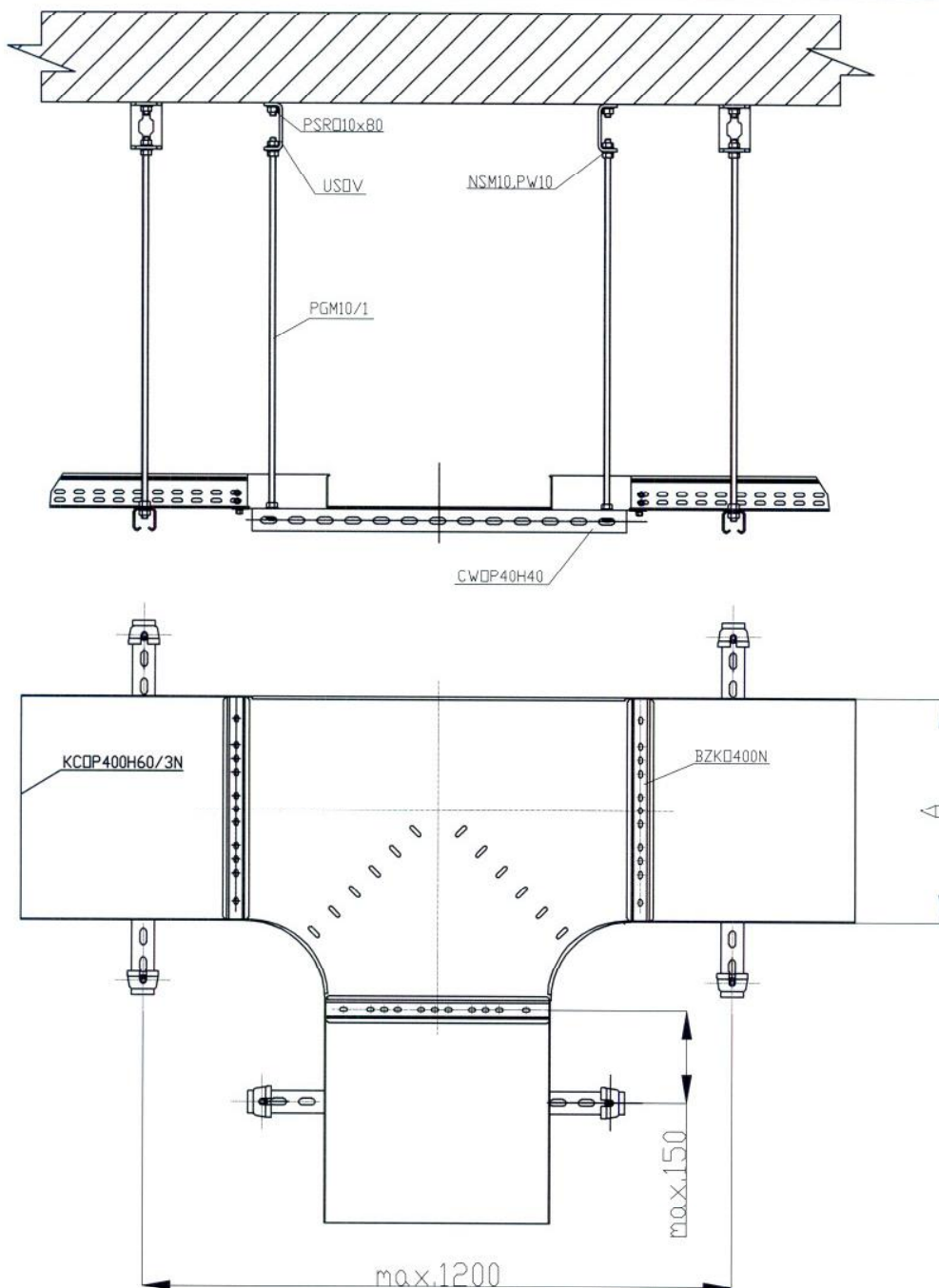
 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i>
	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-FR-198-08-ANIE</i>
Príloha č./Appendix No. <i>32</i>	

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimina PN-EN 10327:2005	3,44	865040
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimina PN-EN 10327:2005	2,48	865030
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimina PN-EN 10327:2005	1,60	865020
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimina PN-EN 10327:2005	0,90	865010
Lp.	Szerokość A (mm)	Grubość (mm)	Materiał (mm)	Masa (kg)	Nr katalogu
		Grubość (mm)	Materiał	Masa (kg)	Podziałka
		-----	-----	-----	1/1
Projektant	M. Stawikowski	10.10.08	Nazwa rysunku		
Opis	M. Stawikowski	10.10.08	Kolanko korytka KKDP400H60 + zawieszka		
Wykonanie			Nr katalogu		
Profesjonalne Systemy Tras Kablowych			8650,...		



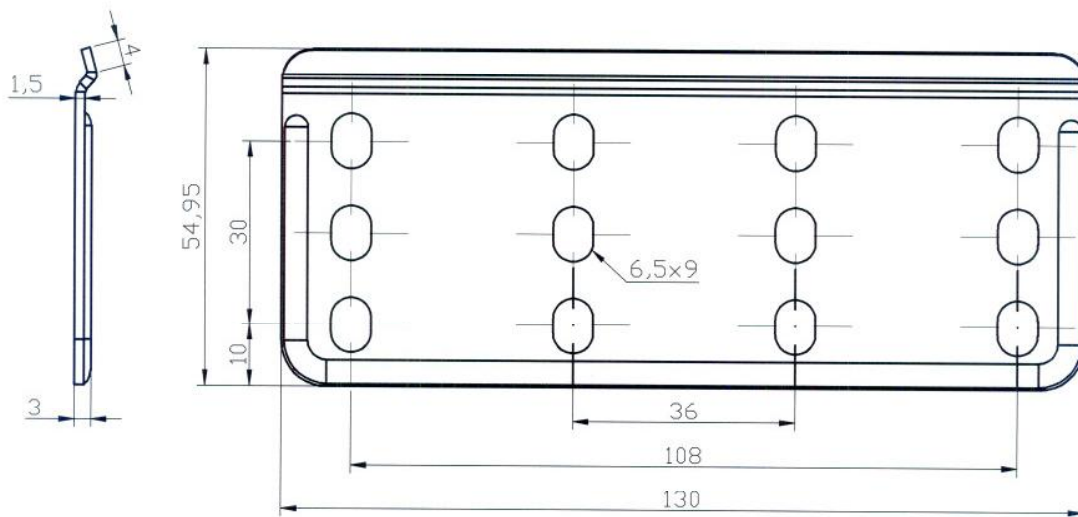
FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 18.09.2008
	Podpis/Signature
Dokument č. Document No. <i>FIRES-FR-198-08-POLIE</i>	
Příloha č./Appendix No. <i>33</i>	

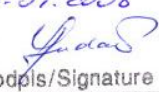
4.	400	1,5	Blacha stalowa cynkowowana metodą Sedzimir PN-EN 10327:2005	5,18	865240																		
3.	300	1,5	Blacha stalowa cynkowowana metodą Sedzimir PN-EN 10327:2005	3,71	865230																		
2.	200	1,5	Blacha stalowa cynkowowana metodą Sedzimir PN-EN 10327:2005	2,48	865220																		
1.	100	1,5	Blacha stalowa cynkowowana metodą Sedzimir PN-EN 10327:2005	1,84	865210																		
L.p.	Szerokość a (mm)	Grubość (mm)	Material (mm)	Masa (kg)	Nr katalogu																		
		Grubość blachy (mm) —	Material —	Masa (kg) —	Podziałka 1:1																		
Projektant	M. Stawikowski		09.10.08	Trójkąt korytka TKPOP....H60																			
Rysował	M. Stawikowski		09.10.08																				
Sprawdził																							
Zatwierdził																							
 Profesjonalne Systemy Tras Kablowych				Nr katalogu 8652...																			
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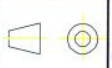


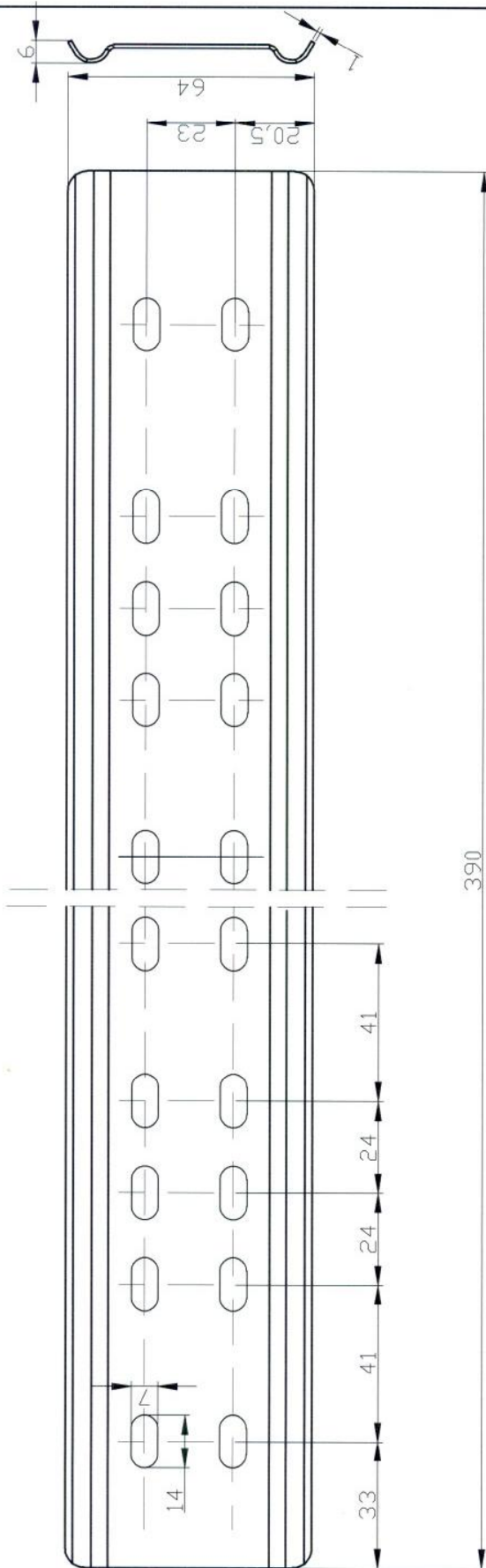
 FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>18. 09. 2008</i>
	Podpis/Signature <i>[Signature]</i>
	Dokument No. <i>FIRES-FR-198-08-PUNE</i>
Priloha č./Appendix No. <i>39</i>	

4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	5,18	865240
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	3,71	865230
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	2,48	865220
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	1,84	865210
Lp.	Szerokość A (mm)	Grubość (mm)	Materiał	Masa (kg)	Nr katalogu
		Grubość (mm)	Materiał	Masa (kg)	Podziałka A4
					1/1
Projektant/ M. Stawikowski	10.10.08	10.10.08	Trójkąt korytka TKDP400H60 + zawiesz.		
Opis/ M. Stawikowski	10.10.08	10.10.08			
Wykonanie/ M. Stawikowski	10.10.08	10.10.08			
Profesjonalne Systemy Tras Kablowych			8652...		



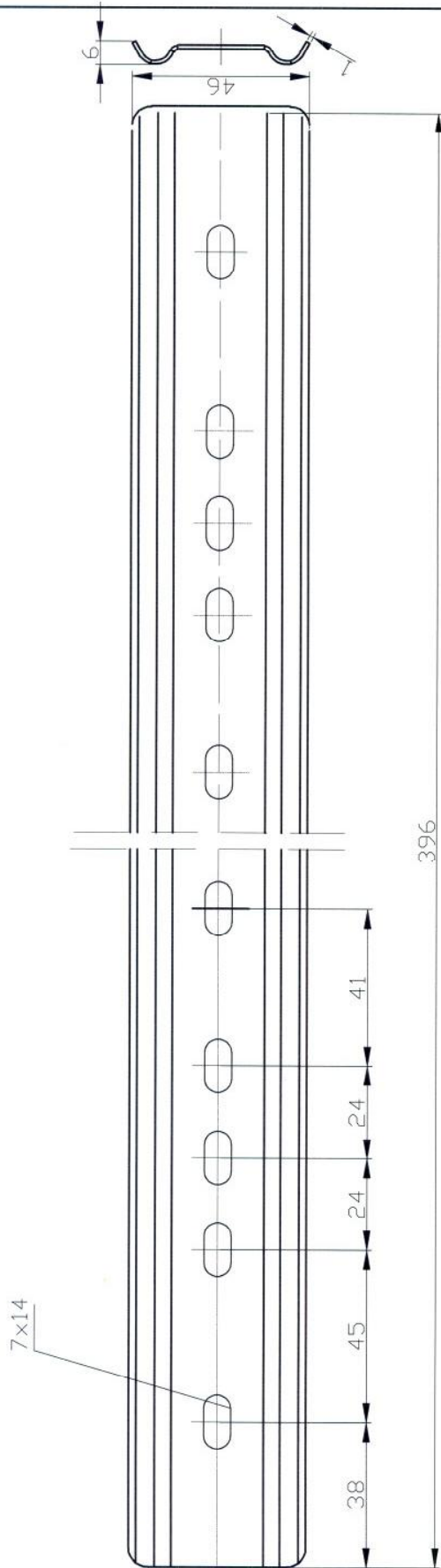
 FIRES s.r.o. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Datum/Date 18-09-2008
	Podpis/Signature 
Dokument č. Document No. <i>FIRES-FR-198-08-AINE</i>	
Příloha č./Appendix No. <i>35</i>	

	Odchyłka vynálezů ne tolerovaných		Materiál Getunek <i>Blach. stal.cynk.met.Sedzinira</i> Nr normy <i>PN-EN 10327:2005</i> půlfabrikat (nr normy)	Masa [kg]	Podzielka 1:1	Format <i>A4</i> Arkusz Arkuszy									
	Projektował Rysował Sprawił Zatwierdził	J.GROCHOWSKI J.Grochowski T.WŁODARCZYK J.KLICZEK	Podpis _____ _____ _____ _____	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku <i>LPOPH60N</i>										
Profesjonalne Systemy Tras Kablowych			Nr rysunku <i>860700</i>	Nr zmlowy <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>											



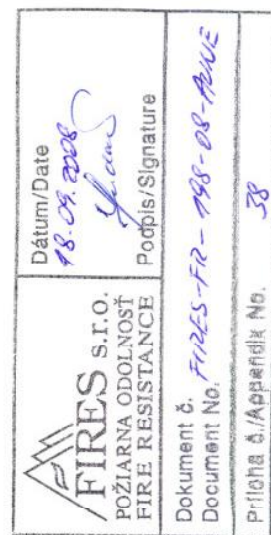
	Dátum/Date 18.09.2028
	Podpis/Signature <i>[Signature]</i>
Dokument č. FIRES- FR- 198-08- PRUFE Document No.	
Príloha č./Appendix Nb. 36	

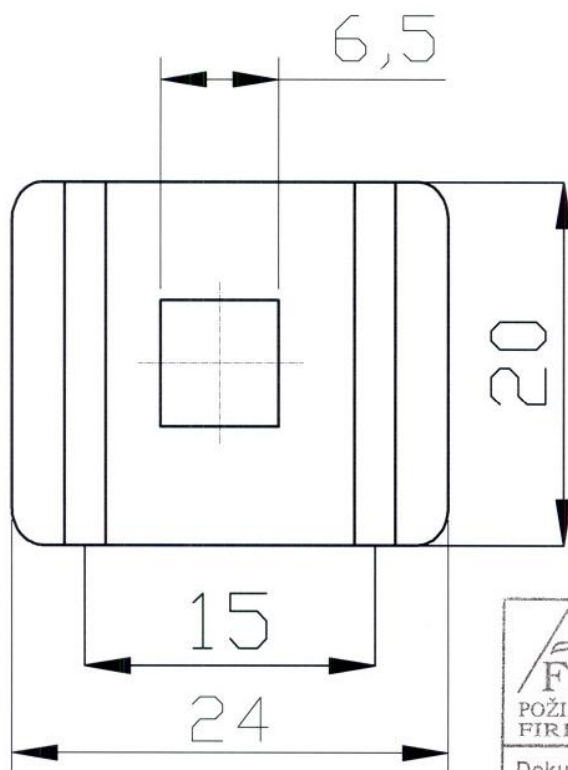
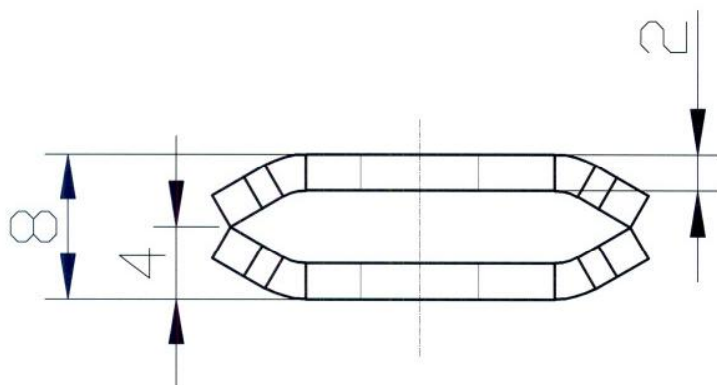
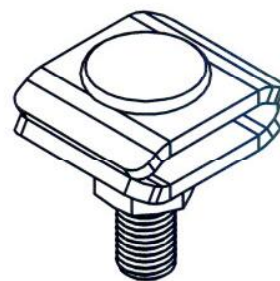
	Dátum 20.10.05 20.10.05 20.10.05	Blacha stálykovač 10027/005 10027/005	0,24 1,1	Formet A3 1:1
	20.10.05 20.10.05 20.10.05	20.10.05 20.10.05 20.10.05	20.10.05 20.10.05 20.10.05	20.10.05 20.10.05 20.10.05
Profesjonale Systemy Tras Kablovych		Blacha tacykovač 862440		



	Dátum/Date	18.09.2008
	POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Podpis/Signature
	Dokument č. FIRES-FR-198-08-PANE	
Príloha č./Appendix No.		34

	Dátum vydania 20.10.05 20.10.05 20.10.05	Dátum prijatia 20.10.05 20.10.05 20.10.05	Miesto zhotovenia BZK 400N Blacha zakončená	Miesto použitia 1:1 862540	Formát A3
	Miesto zhotovenia BZK 400N Blacha zakončená				Miesto použitia 1:1 862540



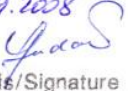


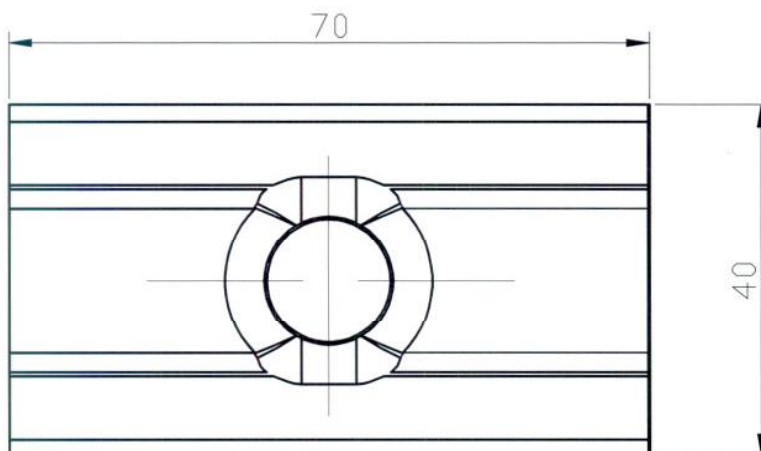
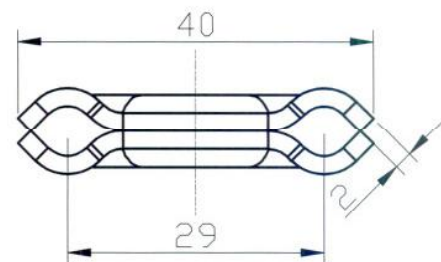
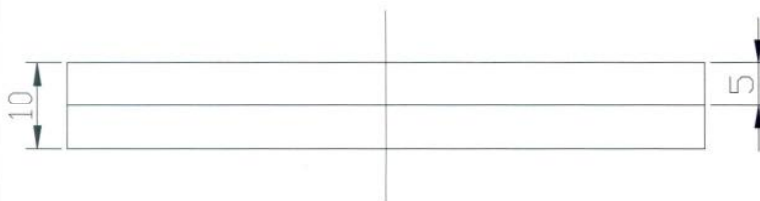
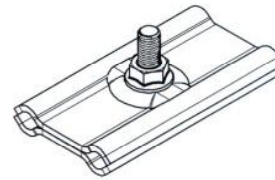
 FIRES s.r.o. POŽIARNÁ ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 18. 09. 2008
	Podpis/Signature <i>[Signature]</i>
Dokument č. / Document No. <i>FIRES-FR-198-08-01WE</i>	
Príloha č. / Appendix No. <i>39</i>	

	Odchytka výměřů netolerovaných	Materiál Gatunek Blacha stal. cynk. net. Sedziwa Nr normy PN-EN 10327:2005 półfabrykat (nr normy)	Masa (kg) 0,03	Podziałka 1:1	Format A4 Arkusz 1 Arkuszy 1
Nr programu maszynowego ---			Nr rysunku 806000		
Nr zmlany			Nr zmlany		

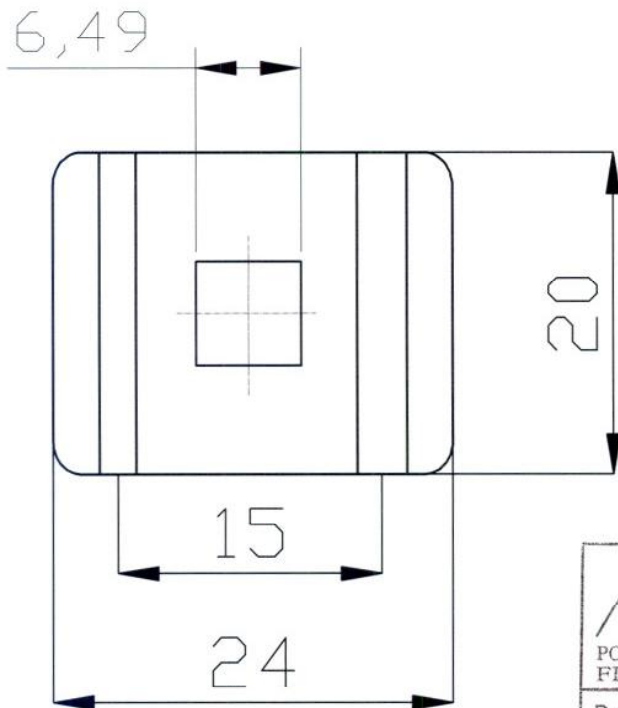
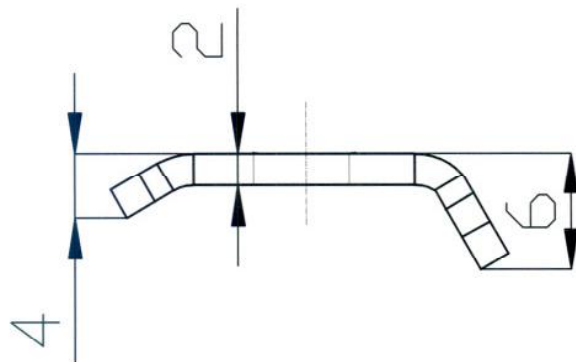


Profesjonalne Systemy
Tras Kablowych

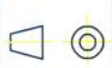
 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 18.09.2008  Podpis/Signature
	Dokument č. / Document No. FIRES-FR-198-08-AVNE
Príloha č./Appendix No. 40	

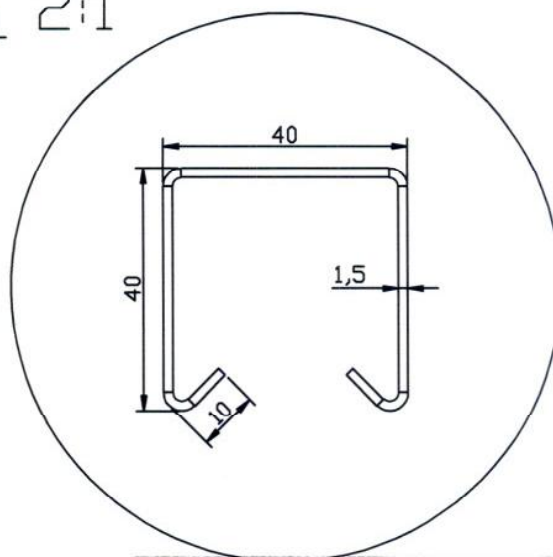


	Odchyłka wyniarów nietolerowanych		Materiał Gatunek: Blacha stalocynkna Sędziwina Nr normy: PN-EN 10327:2005 półfabrykat (nr normy):	Masa [kg]: 0,07	Podziałka	Format: A4 Arkusz Arkuszy									
Projektował	M. Stawikowski	Podpis _____ _____ _____ _____	20.10.05	Nazwa rysunku Uchwyty śrubowy USSPW											
Rysował	M. Stawikowski		20.10.05												
Sprawdził			20.10.05												
Zatwierdził			20.10.05												
 Profesjonalne Systemy Tras Kablowych			Nr rysunku 806200		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>										

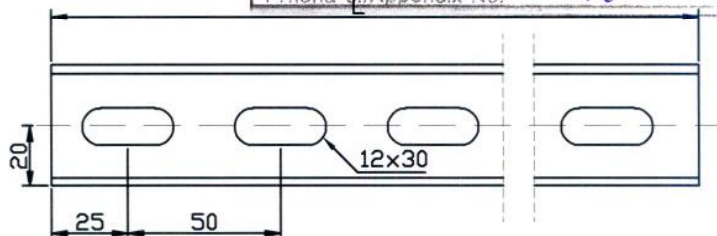
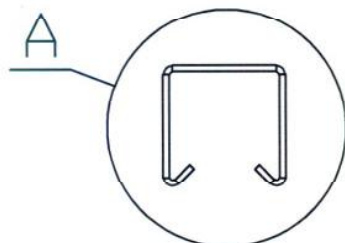


 FIRES s.r.o. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 18.04.2026
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-198-08-AWE</i>	
Príloha č./Appendix No. <i>41</i>	

	Odkrytka wyniarów nietolerowanych		Materiał	Gatunek	Blechalcynknet.Senzinira	Masa [kg]	Podziałka	Format	A4	
				Nr normy	PN-EN 10327:2005					0,07
				półfabrykat (nr normy)						
Projektował	M.Stawikowski	Podpis	Data	Nazwa rysunku						
Rysował	M.Stawikowski			20.10.05	<i>Zacisk śrubowy ZSD</i>					
Sprawdził				20.10.05						
Zatwierdził				20.10.05						
 Profesjonalne Systemy Tras Kablowych			Nr rysunku		806100		Nr zmiany			

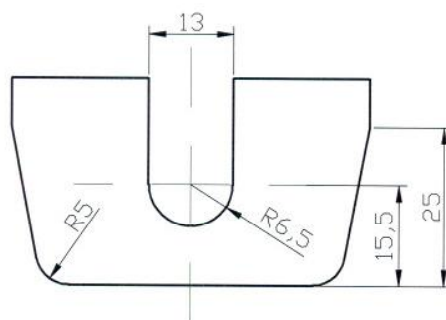
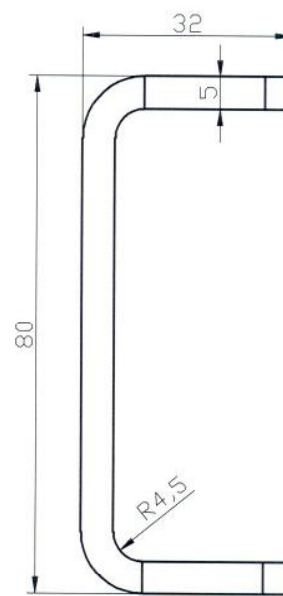
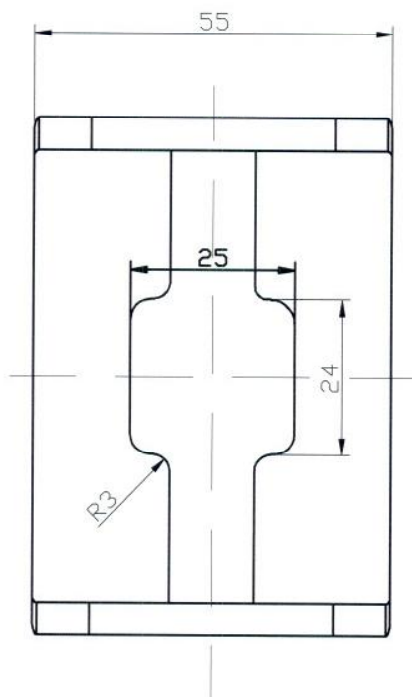


 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-198-08-AME</i>	
Príloha č./Appendix No. <i>62</i>	



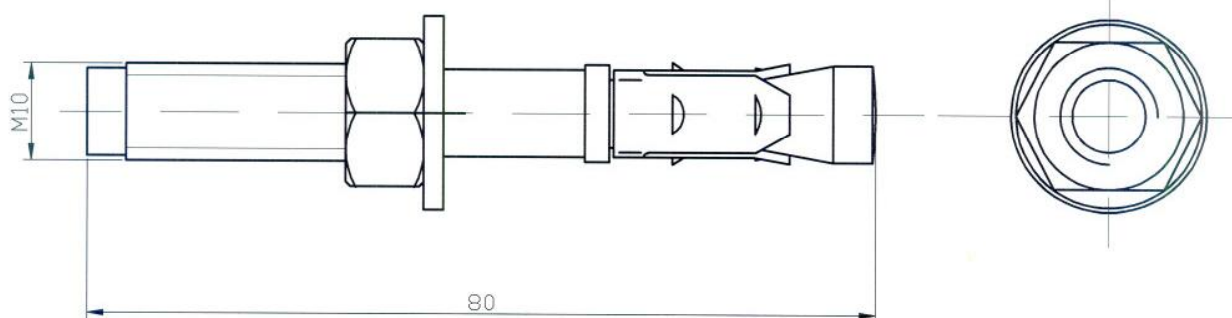
5	Geownik wzmacniony	CWD40H40/ 2	804120	2000	3,50
4	Geownik wzmacniony	CWD40H40/05	804105	500	0,88
3	Geownik wzmacniony	CWD40H40/04	804104	400	0,70
2	Geownik wzmacniony	CWD40H40/03	804103	300	0,53
1	Geownik wzmacniony	CWD40H40/02	804102	200	0,35
LP	Nazwa wyrobu	Symbol	Nr Katalogowy	L [mm]	Masa [kg]

		Długość wyłączka nie tolerowanych	Grubość (mm) 1,5	Materiał Gatunek: Blacha stal. cynk. met. Sendzimir Nr normy: PN-EN 10327:2005 półfabrykat (nr normy): -----	Masa [kg] ---	Podziałka 1:1	Format A4 Arkusz --- Arkuszy ---
Projektował Rysował Sprawdził Zatwierdził	Nazwisko Jacek Grochowski Jakub Rudak Jacek Kłiczek Jacek Kłiczek	Podpis _____ _____ _____ _____	Data 20.10.05 20.02.08 20.02.08 20.02.08	Nazwa rysunku CWOP40H40/...N			Nr zwojów _____ _____ _____
Profesjonalne Systemy Tras Kablowych				Nr rysunku 8041.....			_____ _____ _____

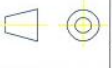


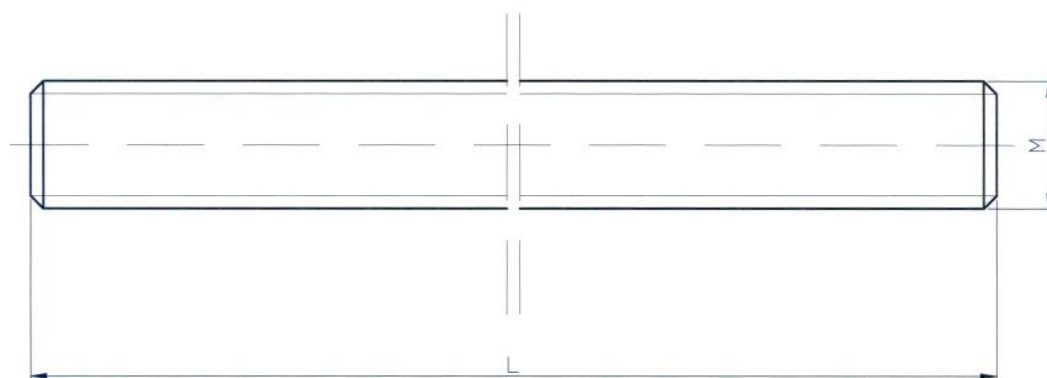
 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date <i>18. 09. 2008</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. <i>FIRES-FR-198-08-ANWE</i> Document No.	
Príloha č./Appendix No. <i>93</i>	

	Odchylka výmiarů netolerovaných	Grubość [mm] 5	Materiál Gatunek <i>Blacha stal. cynk. met. zanurz.</i> Nr normy <i>PN-EN ISO 1461:2000</i> półfabrykat (nr normy)	Masa [kg] 0,21	Podziałka 1:1	Format A4						
Projektował	<i>J.GROCHOWSKI</i>	Podpis _____ _____ _____ _____	20.10.05	Nazwa rysunku USDV								
Rysował	<i>J.Grochowski</i>		Data					20.10.05				
Sprawdził	<i>T.WŁODARCZYK</i>		20.10.05									
Zatwierdził	<i>J.KLICZEK</i>		20.10.05									
 Profesjonalne Systemy Tras Kablowych			Nr rysunku 803700		Nr zbilansy <table border="1"> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table>							



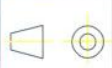
 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. / Document No. <i>FIRES-FR-198-08-PSWE</i>	
Príloha č./Appendix No. <i>99</i>	

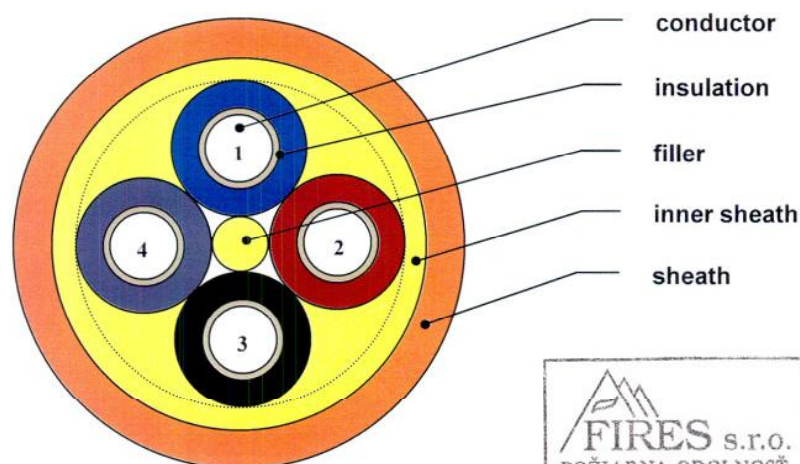
	Odchytka výmiarów nietolerowanych		Material Gatunek Stal cynkowana galwanicznie Nr normy pólfabrykat (nr normy)	Masa [kg]	Podziałka 1:1	Format A4						
Projektował	Nazwisko <i>J.GROCHOWSKI</i> Podpis _____	Data 20.10.05 20.10.05 20.10.05 20.10.05	Nazwa rysunku <i>PSROM10x80</i>									
Rysował												
Sprawdził												
Zatwierdził												
 Profesjonalne Systemy Tras Kablowych			Nr rysunku <i>804100</i>		Nr zmiany <table border="1" data-bbox="1316 1915 1428 2027"> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table>							



 FIRES S.R.O. POŽIARNA ODOLNOST' FIRE RESISTANCE	Dátum/Date <i>18.09.2028</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-198-08-RWE</i>	
Príloha č./Appendix No. <i>45</i>	

PGM12/1	12	1000	0,72	651201
PGM10/1	10	1000	0,49	651001
PGM6/1	6	1000	0,16	650301
Symbol	Gwint M (mm)	Długość L (mm)	Masa (kg)	Nr katalogowy

	Długość wymiarów niezależnych -	Grubość [mm] -	Materiał Gatunek Nr normy	Stal cynkowana galwanicznie 	Masa [kg]	Podziałka 2:1	Format A4
			Nr rysunku	Masa [kg]	Podziałka	Format	
Projektant J.GROCHOWSKI	Nazwisko J.Grochowski T.WŁODARCZYK J.KLICZEK	Podpis 	Data 20.10.05	Nazwa rysunku <i>PGM.../1</i>			
Rysował 			Data 20.10.05				
Sprawdził 			Data 20.10.05				
Zatwierdził 			Data 20.10.05				
	Profesjonalne Systemy Tras Kablowych			Nr rysunku	Nr zmiany		

NHXX FE180 PH30/E30 0,6/1 kV**FIRE RESISTANT HALOGEN FREE POWER CABLES**

 FIRES S.R.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-F2-198-08-ANNE</i>	
Príloha č./Appendix No. <i>56</i>	

APPLICATIONS

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

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

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

The cables are certified by Scientific and Research Development Centre for Fire Protection (Centrum Naukowo-Badawcze Ochrony Przeciwpowazarowej) 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%). |



 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18.09.2008
	Podpis/Signature
Dokument č. Document No. <i>FIRES-F2-198-08-AWWE</i>	
Príloha č./Appendix No. <i>48</i>	

ISO 9001:2000

NHXX 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 ÷ 4
24 - 40	1; 1,5; 2,5

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -15 to +90°C
Insulation resistivity at 90°C, minimum	1 x 10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Circuit integrity *	
conductivity, approximate	0.4 μS/mm	E30	DIN 4102-12
Smoke density per PN-EN 50268-2-3, IEC 61034-2		PH30	PN-EN 50200 or PN-EN 50362
light transmittance, minimum	94%	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

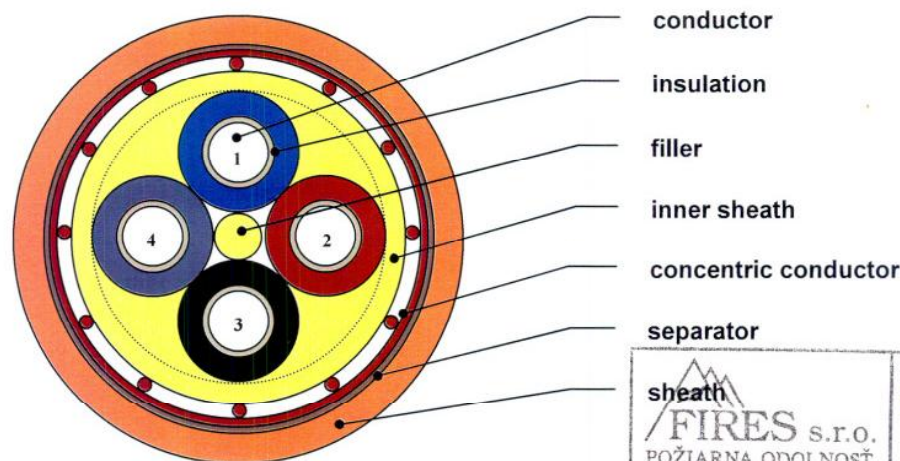
* Circuit integrity is dependent on installation method.

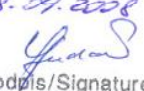
☑ = the cable meets requirements of the low voltage directive 2006/95/WE

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)	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		mm ²	mm	kg/km	kg/km
	1 x 6,0 RE	8,3	58,0	120		3 x 16 RM	20,9	461,0	885
	1 x 10 RE	9,3	96,0	160		3 x 25 RM	24,6	720,0	1270
	1 x 16 RE	10,3	154,0	240		4 x 1,5 RE	14,7	58,0	315
	1 x 25 RM	12,3	240,0	340		4 x 2,5 RE	15,7	96,0	380
	1 x 35 RM	13,4	336,0	450		4 x 4,0 RE	16,9	154,0	475
	1 x 50 RM	14,1	480,0	570		4 x 6,0 RE	18,1	230,0	585
	1 x 70 RM	15,9	672,0	775		4 x 10 RE	20,1	384,0	805
	1 x 95 RM	17,7	912,0	1030		4 x 16 RM	22,7	614,0	1095
	1 x 120 RM	19,3	1152,0	1260		4 x 25 RM	26,8	960,0	1550
	2 x 1,5 RE	13,2	28,8	245		4 x 35 RM	30,7	1920,0	1550
	2 x 2,5 RE	14,0	48,0	285		4 x 50 RM	31,7	1920,0	2590
	2 x 4,0 RE	14,9	77,0	345		5 x 1,5 RE	15,8	72,0	365
	2 x 6,0 RE	15,9	115,0	415		5 x 2,5 RE	16,9	120,0	445
	2 x 10 RE	17,6	192,0	550		5 x 4,0 RE	18,2	192,0	560
	2 x 16 RE	19,6	307,0	745		5 x 6,0 RE	19,5	288,0	695
	2 x 25 RM	23,2	480,0	1030		5 x 10 RE	21,8	480,0	965
	3 x 1,5 RE	13,7	43,2	270		5 x 16 RM	24,8	768,0	1320
	3 x 2,5 RE	14,6	72,0	325		5 x 25 RM	28,5	1200,0	1880
	3 x 4,0 RE	15,6	115,0	400		5 x 35 RM	31,8	1680,0	2480
	3 x 6,0 RE	16,7	173,0	490		5 x 50 RM	35,0	2400,0	3180
	3 x 10 RE	18,5	288,0	670		7 x 1,5 RE	16,9	101,0	425

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

Other cross-sections and conductor counts available on request.

NHXCH FE180 PH30/E30 0,6/1 kV**FIRE RESISTANT HALOGEN FREE POWER CABLES**

 POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 18. 07. 2008
	Podpis/Signature 
Dokument č. Document No. FIRES-FR-188-08-ANIE	
Príloha č./Appendix No. 48	

APPLICATIONS

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

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

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

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

NHXCH FE180 PH30/E30 0,6/1 kV

CHARACTERISTICS

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

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 ÷ 4
24 - 40	1; 1.5; 2.5

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -15 to +90°C
Insulation resistivity at 90°C, minimum	1 x 10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Circuit integrity *	
conductivity, approximate	0.4 μS/mm	E30	DIN 4102-12
Smoke density per PN-EN 50268-2-3, IEC 61034-2		PH30	PN-EN 50200 or PN-EN 50362
light transmittance, minimum	94%	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.

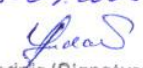
☑ = the cable meets requirements of the low voltage directive 2006/95/WE

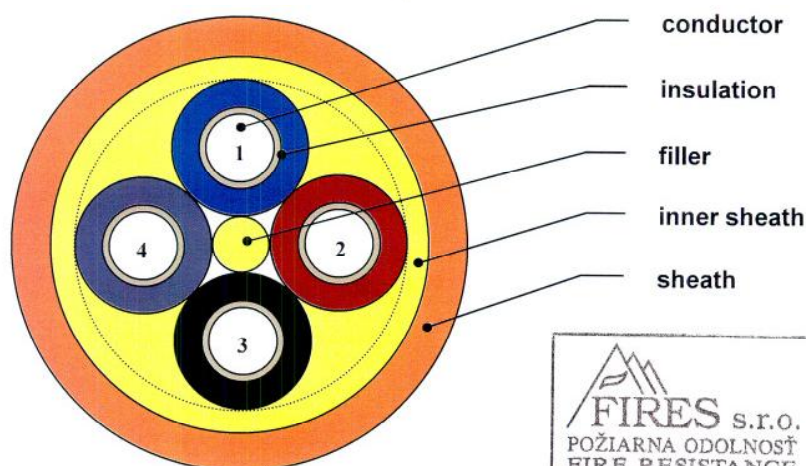
Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm ²	mm	kg/km	kg/km
	3 x 1,5RE/1,5	15,4	43,2	320
	3 x 2,5 RE/2,5	16,5	72	390
	3 x 4,0 RE/4,0	17,6	115	460
	3 x 6,0 RE/6,0	19,6	173	590
	3 x 10 RE/10	22,6	288	840
	3 x 16 RE/16	25,8	461	1190
	3 x 25 RM/16	29,1	720	1570
	3 x 35 RM/16	32,7	1190	1960
	3 x 50 RM/25	35,7	1723	2560
	4 x 1,5RE/1,5	15,8	72	350
	4 x 2,5 RE/2,5	17,8	96	450
	4 x 4,0 RE/4,0	18,9	154	530

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	21,1	230	690
	4 x 10 RE/10	25,8	384	1020
	4 x 16 RE/16	25,2	614	1280
	4 x 25 RM/16	31,5	960	1890
	4 x 35 RE/16	32,3	1498	2350
	4 x 50 RM/25	34,4	2160	2870
	7 x 1,5RE/2,5	19,5	101	520
	7 x 2,5 RE/2,5	20,7	168	620
	12 x 1,5RE/2,5	24,6	101	830
	12 x 2,5 RE/4,0	26,7	168	1030

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

Other cross-sections and conductor counts available on request.

 FIRE S.R.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18-09-2008
	Podpis/Signature 
Dokument č. / Document No. FIRE-FR-198-08-AWE	
Príloha č./Appendix No. 49	

NHXX FE180 PH90/E90 0,6/1 kV**FIRE RESISTANT HALOGEN FREE POWER CABLES**

 FIRES s.r.o. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i>
	Podpis/Signature <i>[Signature]</i>
	Dokument č. Document No. <i>FIRES-FR-198-08-ADNE</i>
Príloha č./Appendix No. <i>50</i>	

APPLICATIONS

NHXX 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 Przeciwpowarowej) 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%). |



 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date <i>18. 09. 2008</i>
	Podpis/Signature <i>[Signature]</i>
Dokument č. Document No. <i>FIRES-FR-198-08-ANNE</i>	
Príloha č./Appendix No. <i>51</i>	

ISO
9001:2000**NHXX 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 ÷ 4
24 - 40	1; 1.5; 2.5

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -15 to +90°C
Insulation resistivity at 90°C, minimum	1 x 10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Circuit integrity *	
conductivity, approximate	0.4 μS/mm	E90	DIN 4102-12
Smoke density per PN-EN 50268-2-3, IEC 61034-2		PH90	PN-EN 50200 or PN-EN 50362
light transmittance, minimum	94%	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.

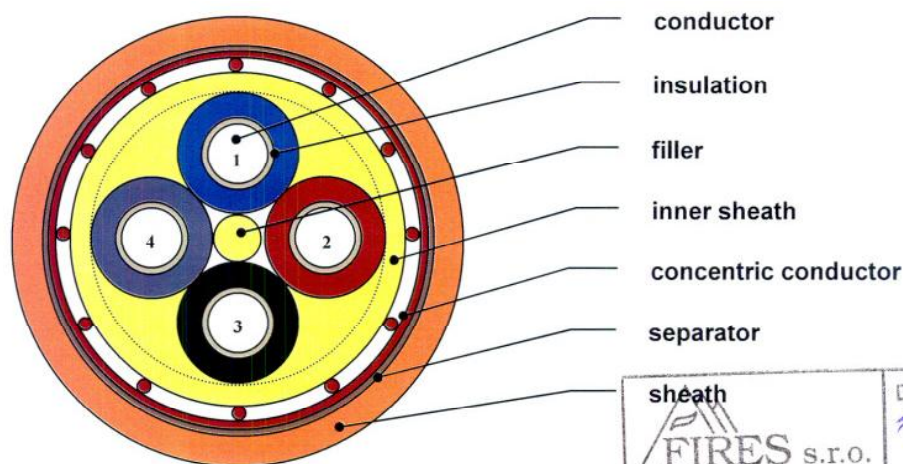
CE = the cable meets requirements of the low voltage directive 2006/95/WE

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 6,0 RE	8,4	58,0	125
	1 x 10 RE	9,4	96,0	170
	1 x 16 RE	10,4	154,0	250
	1 x 25 RM	12,4	240,0	355
	1 x 35 RM	13,4	336,0	450
	1 x 50 RM	14,5	480,0	580
	1 x 70 RM	16,4	672,0	790
	1 x 95 RM	18,1	912,0	1040
	1 x 120 RM	19,7	1152,0	1275
	2 x 1,5 RE	14,0	28,8	265
	2 x 2,5 RE	14,8	48,0	315
	2 x 4,0 RE	15,7	77,0	375
	2 x 6,0 RE	16,7	115,0	445
	2 x 10 RE	18,4	192,0	585
	2 x 16 RE	20,4	307,0	780
	2 x 25 RM	24,0	480,0	925
	3 x 1,5 RE	14,9	43,2	315
	3 x 2,5 RE	15,5	72,0	355
	3 x 4,0 RE	16,5	115,0	435
	3 x 6,0 RE	17,6	173,0	525
	3 x 10 RE	19,3	288,0	690

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

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	22,0	461,0	980
	3 x 25 RM	25,5	720,0	1390
	4 x 1,5 RE	15,7	58,0	350
	4 x 2,5 RE	16,7	96,0	420
	4 x 4,0 RE	17,8	154,0	510
	4 x 6,0 RE	19,0	230,0	625
	4 x 10 RE	20,9	384,0	835
	4 x 16 RM	23,7	614,0	1140
	4 x 25 RM	27,8	960,0	1720
	4 x 35 RM	29,5	1344,0	2050
	4 x 50 RM	32,7	1920,0	2660
	5 x 1,5 RE	17,2	72,0	425
	5 x 2,5 RE	18,2	120,0	505
	5 x 4,0 RE	19,3	192,0	610
	5 x 6,0 RE	20,7	288,0	750
	5 x 10 RE	22,7	480,0	1000
	5 x 16 RE	26,3	768,0	1460
	5 x 25 RM	30,6	1200,0	2100
	5 x 35 RM	32,9	1680,0	2550
	5 x 50 RM	37,7	2400,0	3550
	7 x 1,5 RE	18,1	101,0	475

Other cross-sections and conductor counts available on request.

NHXCH FE180 PH90/E90 0,6/1 kV**FIRE RESISTANT HALOGEN FREE POWER CABLES**

sheath FIRES S.I.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i> Podpis/Signature <i>[Signature]</i>
Dokument č. <i>FIRES-FR-198-08-ANDE</i> Document No.	
Príloha č./Appendix No. <i>52</i>	

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%). |

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

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

Operating voltage	0.6/1 kV	Operating temperature range	
Voltage test	4.0 kV rms	during operation	from -15 to +90°C
Insulation resistivity at 90°C, minimum	1 x 10 ¹¹ Ω·cm	during installation	from -5 to +70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	12 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Circuit integrity *	
conductivity, approximate	0.4 μS/mm	E90	DIN 4102-12
Smoke density per PN-EN 50268-2-3, IEC 61034-2		PH90	PN-EN 50200 or PN-EN 50362
light transmittance, minimum	94%	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.

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

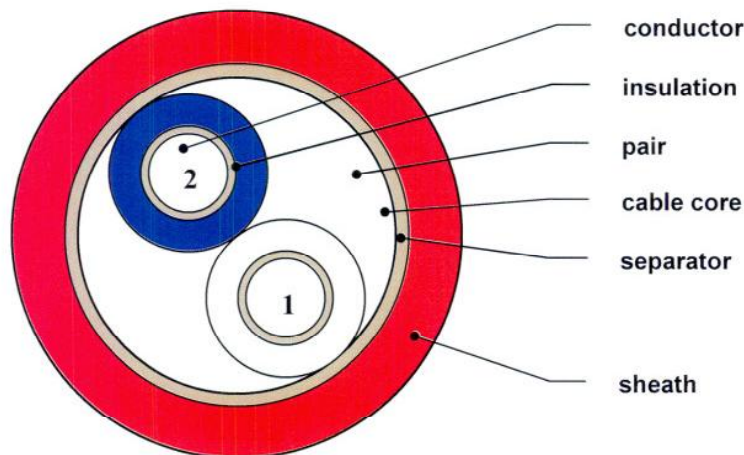
Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm ²	mm	kg/km	kg/km
	3 x 1,5RE/1,5	16,6	43,2	360
	3 x 2,5 RE/2,5	17,7	72	430
	3 x 4,0 RE/4,0	18,8	115	520
	3 x 6,0 RE/6,0	20,8	173	660
	3 x 10 RE/10	23,8	288	940
	3 x 16 RE/16	26,2	461	1340
	3 x 25 RM/16	30,4	720	1750
	3 x 35 RM/16	33,0	1190	2160
	3 x 50 RM/25	37,0	1723	2840
	4 x 1,5RE/1,5	16,8	81	390
	4 x 2,5 RE/2,5	19,0	96	500
	4 x 4,0 RE/4,0	20,1	154	600

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

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	22,3	230	770
	4 x 10 RE/10	25,1	384	1140
	4 x 16 RE/16	26,2	614	1340
	4 x 25 RM/16	32,8	960	2100
	4 x 35 RE/16	35,6	1408	2610
	4 x 50 RM/25	35,4	2160	2950
	7 x 1,5RE/2,5	20,7	101	580
	7 x 2,5 RE/2,5	21,9	168	690
	12 x 1,5RE/2,5	25,9	101	935
	12 x 2,5 RE/4,0	27,9	168	1150

Other cross-sections and conductor counts available on request.

 FIRES S.R.O. POŻIARNA ODOLNOŚĆ FIRE RESISTANCE	Dátum/Date 18. 09. 2008
	Podpis/Signature
	Dokument č. Document No. <i>FIRES-FR-198-08-ANNE</i>
Príloha č./Appendix No. <i>53</i>	

HTKSH FE180 PH90/E30-E90**FIRE RESISTANT HALOGEN FREE CABLES****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%).

 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date <i>18.09.2008</i> Podpis/Signature <i>[Signature]</i>
Dokument č. / Document No. <i>FIRES-FR-198-08-AWE</i>	
Príloha č./Appendix No. <i>54</i>	

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
	average		60	70	70	70	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%

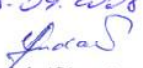
Operating temperature range during operation from - 30 to + 80°C
during installation from - 5 to + 70°C
Minimum bending radius 10 x cable diameter
Cable combustibility flame retardant
Combustibility tests PN-EN 60332-1-2
Circuit integrity *
E30-E90 DIN 4102-12
PH90 PN-EN 50200 or EN 50362
Insulation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

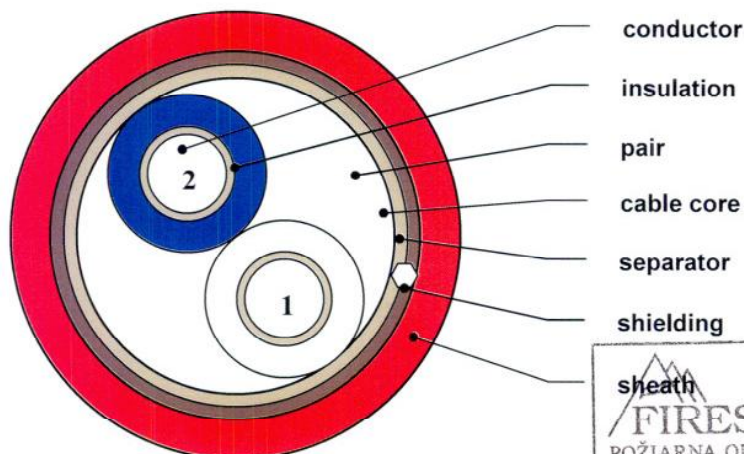
* Circuit integrity is dependent on installation method.

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	15	61
HTKSH FE180 PH90/E30-E90	1 x 2 x 1.0	7.7	20	70

Other diameters and conductor counts available on request.

 FIRES s.r.o. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18. 09. 2008
	Podpis/Signature 
Dokument č. Document No. FIRES-FR-18-08-111E	
Příloha č./Appendix No. 55	

HTKSHekw FE180 PH90/E30-E90**FIRE RESISTANT HALOGEN FREE CABLES**

FIRES S.R.O. POŽIARNA ODOLNOST FIRE RESISTANCE	Dátum/Date 18. 09. 2008 Y. d. S.
	Podpis/Signature
Dokument č. / Document No. FIRES-FR-0998-08-PH90	
Príloha č./Appendix No. 56	

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%).

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
	average		90	130	130	150	150

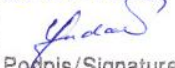
Operating voltage	240 V	Operating temperature range	
Voltage test	1.5 kV rms	during operation	from - 30 to + 80°C
Insulation resistance, minimum	100 MΩ·km	during installation	from - 5 to + 70°C
Inductance, approximate	0.7 mH/km	Minimum bending radius	10 x cable diameter
Corrosivity of emitted gases per PN-EN 50267-2-3, IEC 60754-2		Cable combustibility	flame retardant
pH, approximate	6.8	Combustibility tests	PN-EN 60332-1-2
conductivity, approximate	0.4 μS/mm	Circuit integrity *	
Smoke density per PN-EN 50268-2-3, IEC 61034-2		E30-E90	DIN 4102-12
light transmittance, minimum	94%	PH90	PN-EN 50200 or EN 50362
		Insulation integrity FE180	IEC 60331-21; IEC 60331-11
		Reference standards	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
HTKSHekw FE180 PH90/E30-E90	1 x 2 x 1.0	7.8	20	75

Other diameters and conductor counts available on request.

 FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 18. 08. 2008
	Podpis/Signature 
Dokument č. / Document No. FIRES-FR-198-08-ANF	
Príloha č./Appendix No. 54	