FIRES
The Experts On Fire Safety

TEST REPORT FIRES-FR-198-08-AUNE

Cable bearing system BAKS with cables

FIRES, s.r.o.
Notifikovaná osoba č./ Notified Body No.: 1396
Autorizovaná osoba reg. č./Approved Body No.: SK01
Osloboditeľov 282, 059 35 Batizovce, Slovakia
Tel.+421 52 775 2298, Fax+421 52 7881412, e-mail: info@fires.sk, www.fires.sk

FIRES
The Experts on Fire Safety

SNAS
Reg. No. 041/S-159

Testing laboratory No. 041/S-159 accredited by
Slovak national accreditation service

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 cables

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

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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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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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Fires s.r.o. Batizovce is full member of EGOLF also, more information www.egolf.org.uk.

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 52 4 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:	NHXH 4x1,5 RE FE180 PH30/E30	(8 x)
	NHXH 4x50 RM FE180 PH30/E30	(8 x)
	NHXCH 4x1,5/1,5 RE FE180 PH30/E30	(4 x)
	NHXCH 4x50/25 RM FE180 PH30/E30	(4 x)
	NHXH 4x1,5 RE FE180 PH90/E90	(7 x)
	NHXH 4x50 RM FE180 PH90/E90	(7 x)
	NHXH 1x35 RM FE180 PH90/E90 with joint SMH1	(1 x)
	NHXCH 4x1,5/1,5 RE FE180 PH90/E90	(7 x)
	NHXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4	(1 x)
	NHXCH 4x16/16 RE FE180 PH90/E90	(1 x)
	NHXCH 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, ∅ wire 4,5 mm) were fixed at upper supports and wire trays (type KDSO 400H60/3N, ∅ 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 O_2 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:

Ing. Štefan Rástocký
leader of the testing laboratory

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-1-

Responsible for the technical side of this report:

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

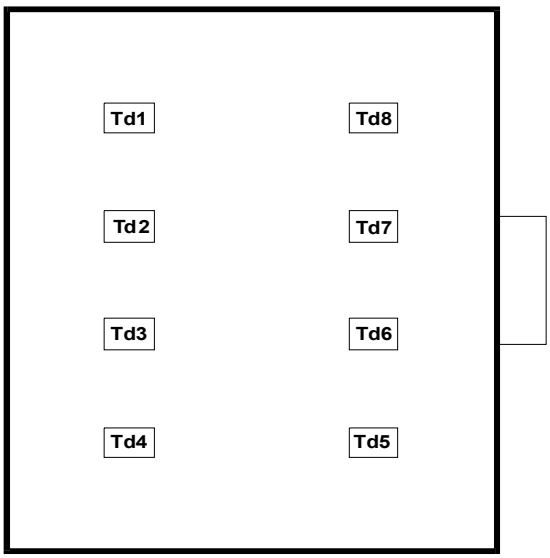
8. LIST OF APPENDICES

Measured values inside the test furnace

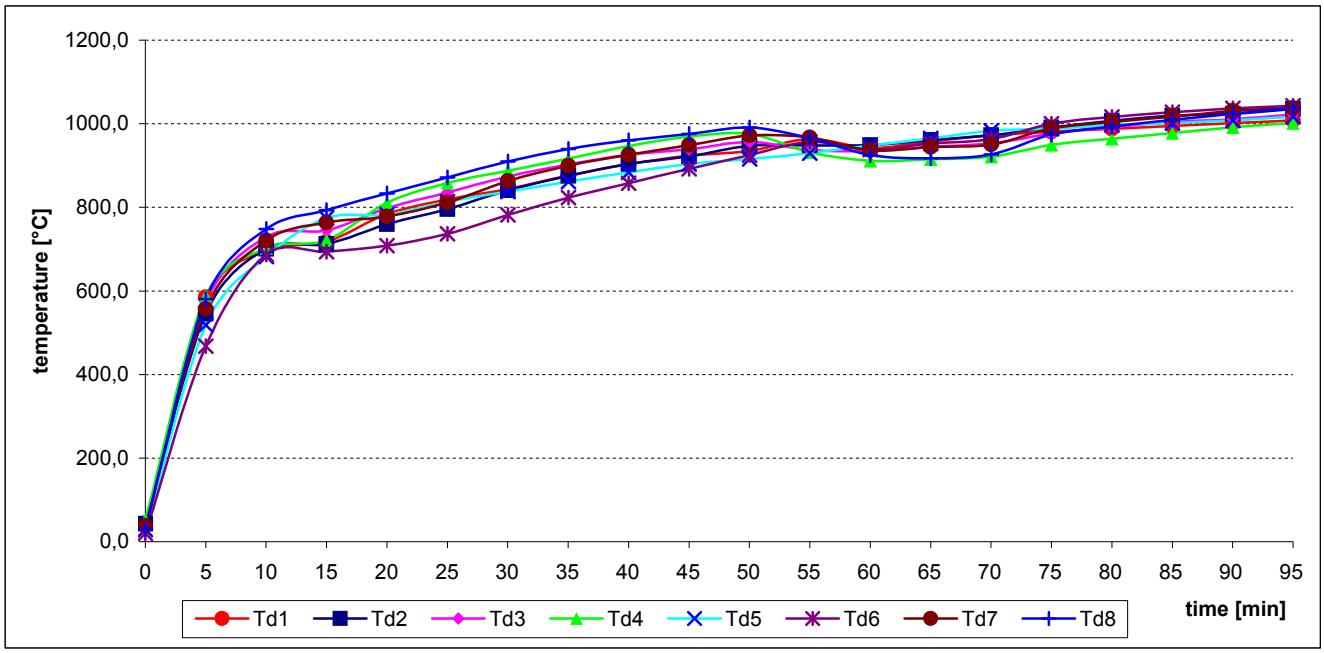
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	43,3	43,1	42,6	52,6	29,4	20,2	38,5	31,2	37,6	20,0	13,8	0,0	0,0
5	584,8	545,3	571,1	589,2	518,3	467,6	556,5	580,8	551,7	576,4	14,1	-6,1	11,7
10	697,1	700,6	728,7	702,2	682,0	687,3	720,6	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

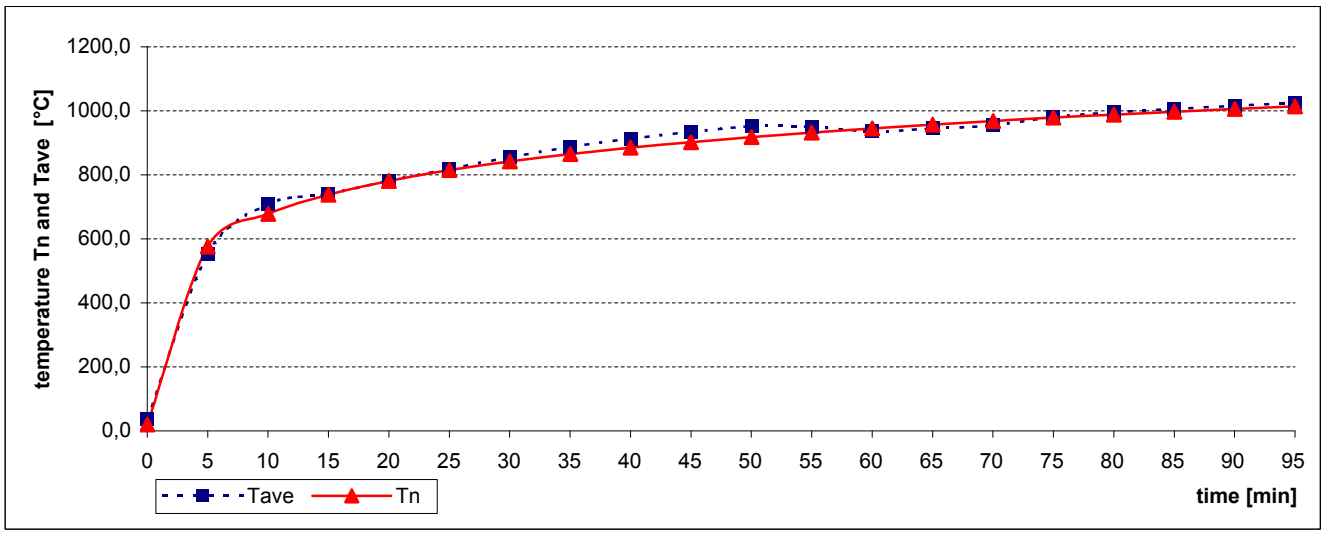
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

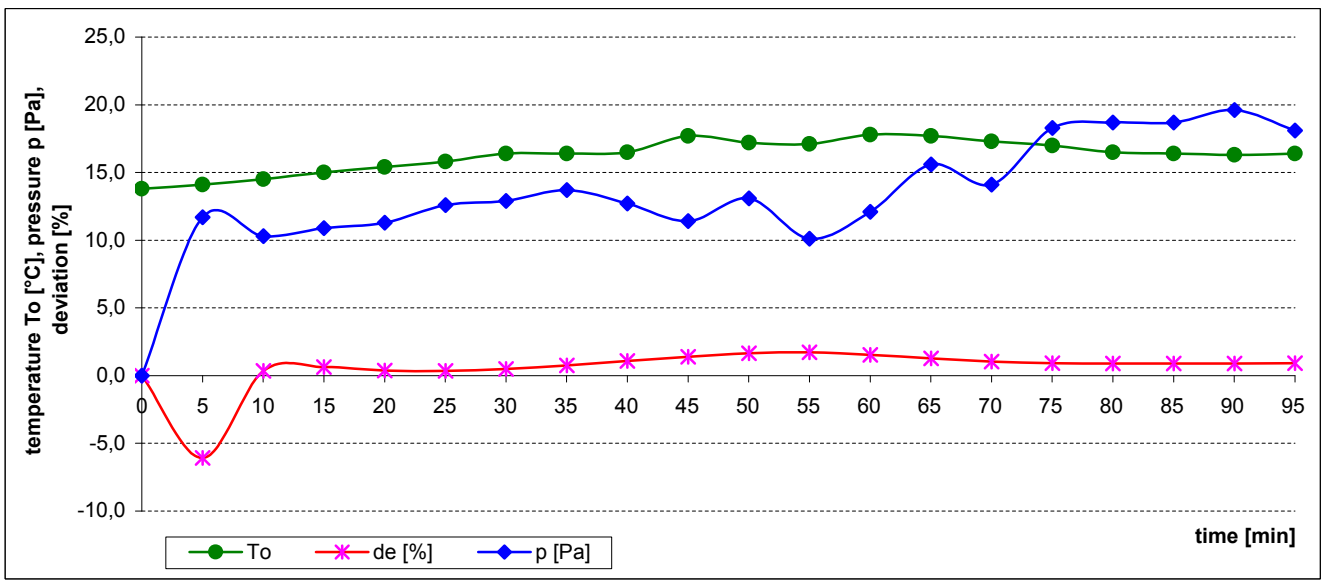
Layout of measuring points in the test furnace:



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
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

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

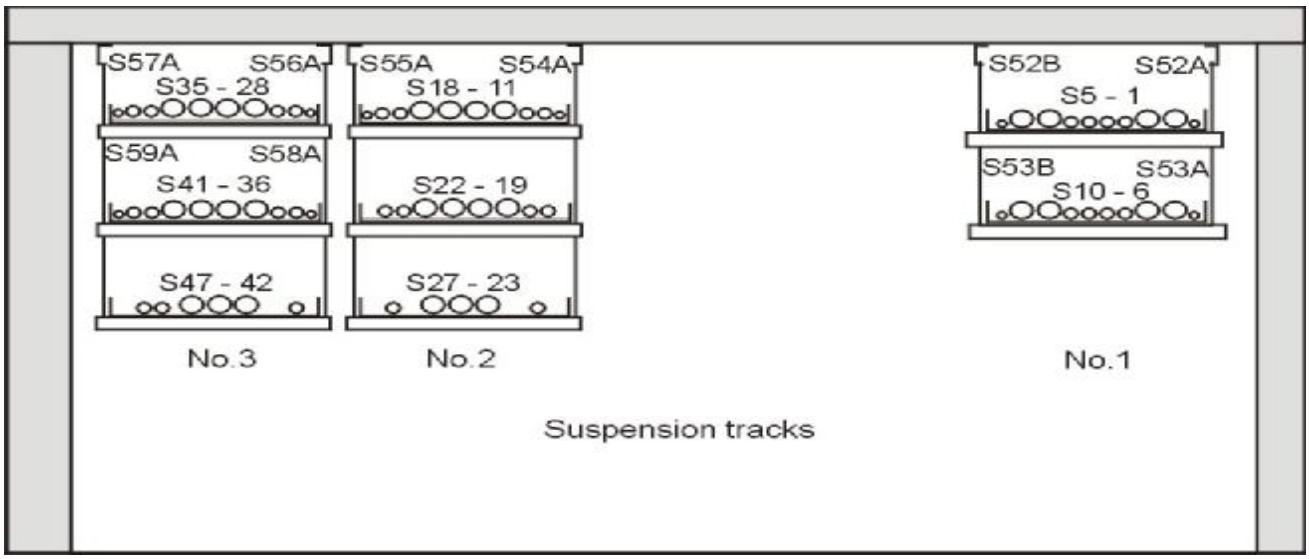
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	x
	210-PEN	86:52
S52B	211-L	x
	212-PEN	82:51
S53A	213-L	x
	214-PEN	73:22
S53B	215-L	54:36
	216-PEN	x
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S55A	221-L	no failure / interruption
	222-PEN	no failure / 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.

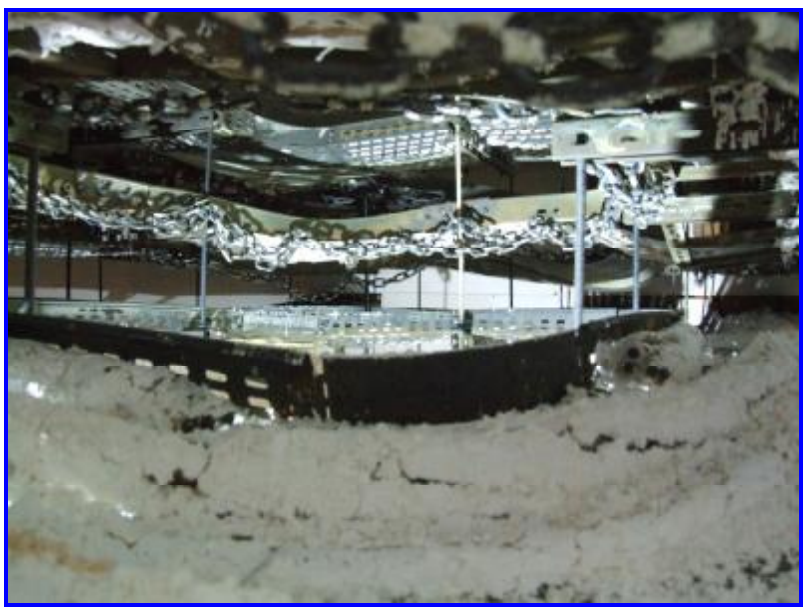
Layout of cables in the test furnace



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	Specimens placed in the cable trays KCOP 400H60/3N (BAKS). Suspension track No.2
Specimen 24: cable NHXH 4x50 RM FE180 PH90/E90	
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 placed on the ladders DGOP 400H60/3N (BAKS). Suspension track No.3
Specimens 29, 34: cables NHXH 4x1,5 RE FE180 PH90/E90	
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	Specimens placed in the cable trays KCOP 400H60/3N (BAKS). Suspension track No.3
Specimen 37: cables NHXCH 4x1,5/1,5 RE FE180 PH30/E30	
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	Specimens placed in the cable trays KCOP 400H60/3N (BAKS) with cable joint busines CELLPACK Suspension track No.3
Specimen 47: cable NHXCH 4x1,5/1,5 RE FE180 PH90/E90 with joint SMH4	

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, Trójnik drabiny TDOP 400H60, B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwytu 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	Korytko kablowe KC0P 400H60/... Kolanko korytka KPPOP 400H60 Trójnik 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	Korytko kablowe KC0P 400H60/... Kolanko korytka KPPOP 400H60 Trójnik 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	Korytko kablowe KC0P 400H60/... Kolanko korytka KPPOP 400H60 Trójnik 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, Trójnik 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		

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Datum/Date 18.09.2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix 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	Korytko kablowe KC0P 400H60/... Kolanko korytka KPPOP 400H60 Trójnik 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
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	Korytko siatkowe kwasoodporne KDS 400H60/... E, B-400/ 1.5 m / 20kg/m / Ópręta 4,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków 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	Korytko siatkowe zwykłe KDS 400H60/... , B-400/ 1.5 m / 20kg/m / Ópręta 4,5 mm Mocowanie : PGM10/..., ceownik CWOP 40H40/05, uchwyt USOV do betonu za pomocą kołków 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		

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Dátum/Date 18.09.2008
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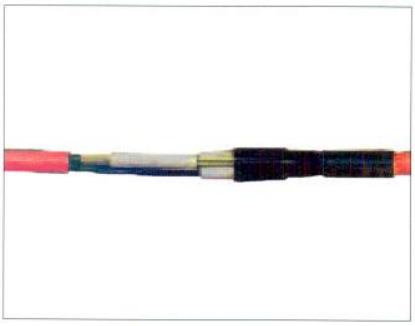
Dokument č./Document No. FIRES-FR-198-08-ANNEX

Príloha č./Appendix No. 19

SMH...E90, SMHC...E90

Heat-shrink straight-through joint

for fire-resistant cables



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 (U_m) 0.6/1 (1.2) kV

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

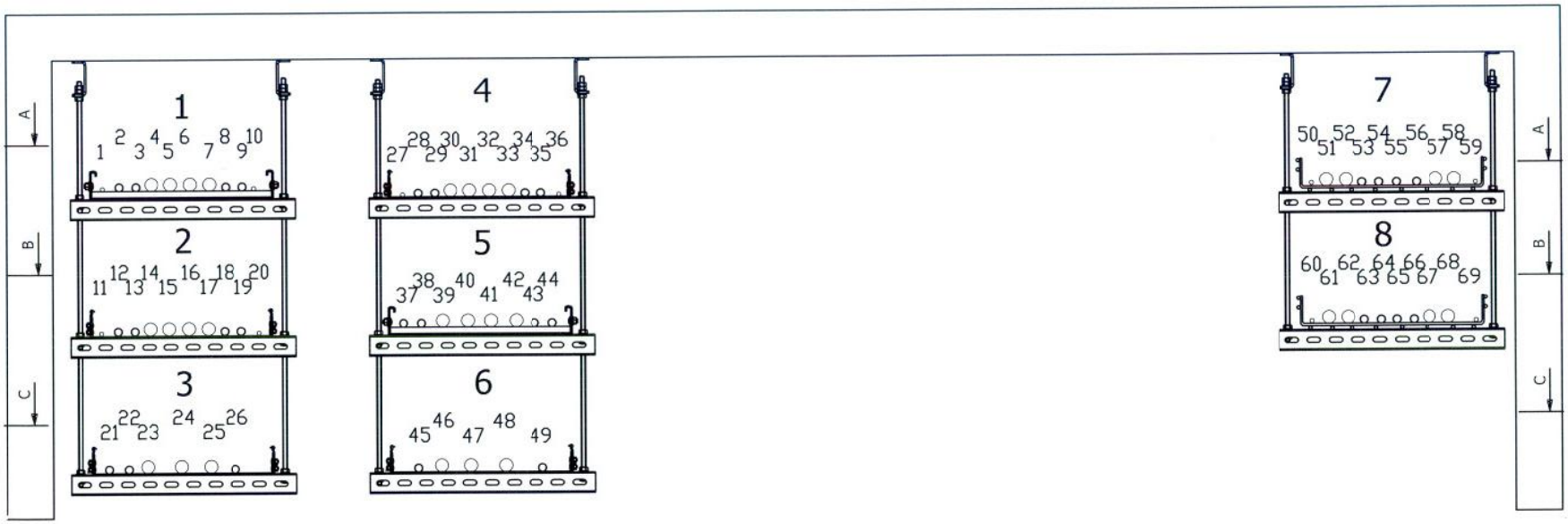
Note
- without connectors

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 mm²			
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



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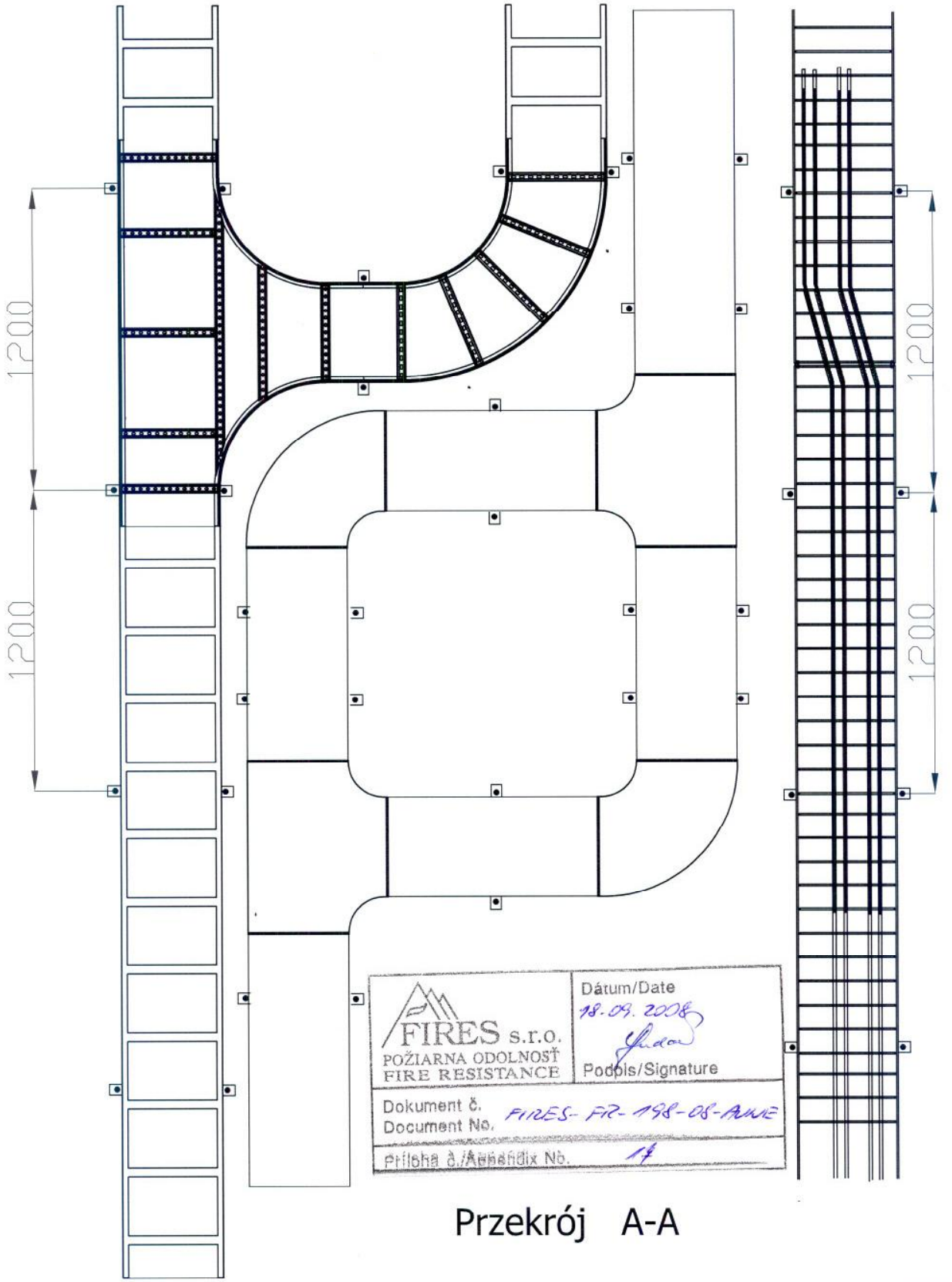
Príloha č./Appendix No. 16

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

	Dachylka wynkrów nietolerowanych		Materiał: Gatunek		Masa 1kg	Podziałka	Format A4
			Nr normy				Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku			
Rysował	JXliczek		05.12.2007				
Sprawdził							
Zatwierdził				Nr programu maszynowego / Nr rysunku			Nr zmiany
Profesjonalne Systemy Tras Kablowych				Fires 18, 09,2008			



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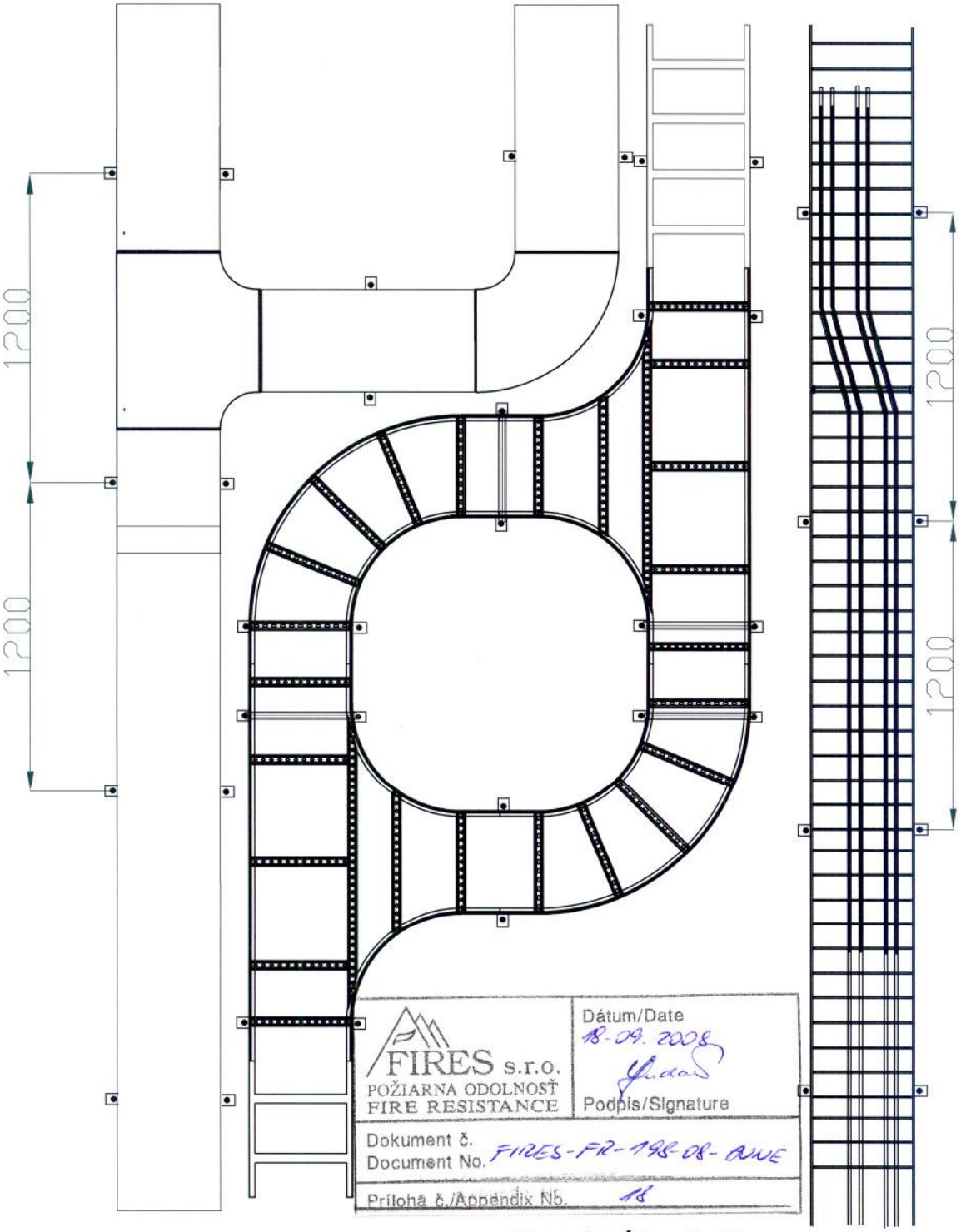
Príloha č./Annendix No. 14

Przekrój A-A

Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4		
		Nr normy	PN-EN 10327:2005			Arkusz		
		półfabrykat (nr normy)				Arkuszy 5		
Projektował				Nazwa rysunku				
Rysował	Nazwisko J.Grochowski	Podpis	Data 05-May-06					
Sprawdził								
Zatwierdził				Nr programu maszynowego		Nr zmiany		
Profesjonalne Systemy Tras Kablowych				Nr rysunku Batizowce 18,09,2008				



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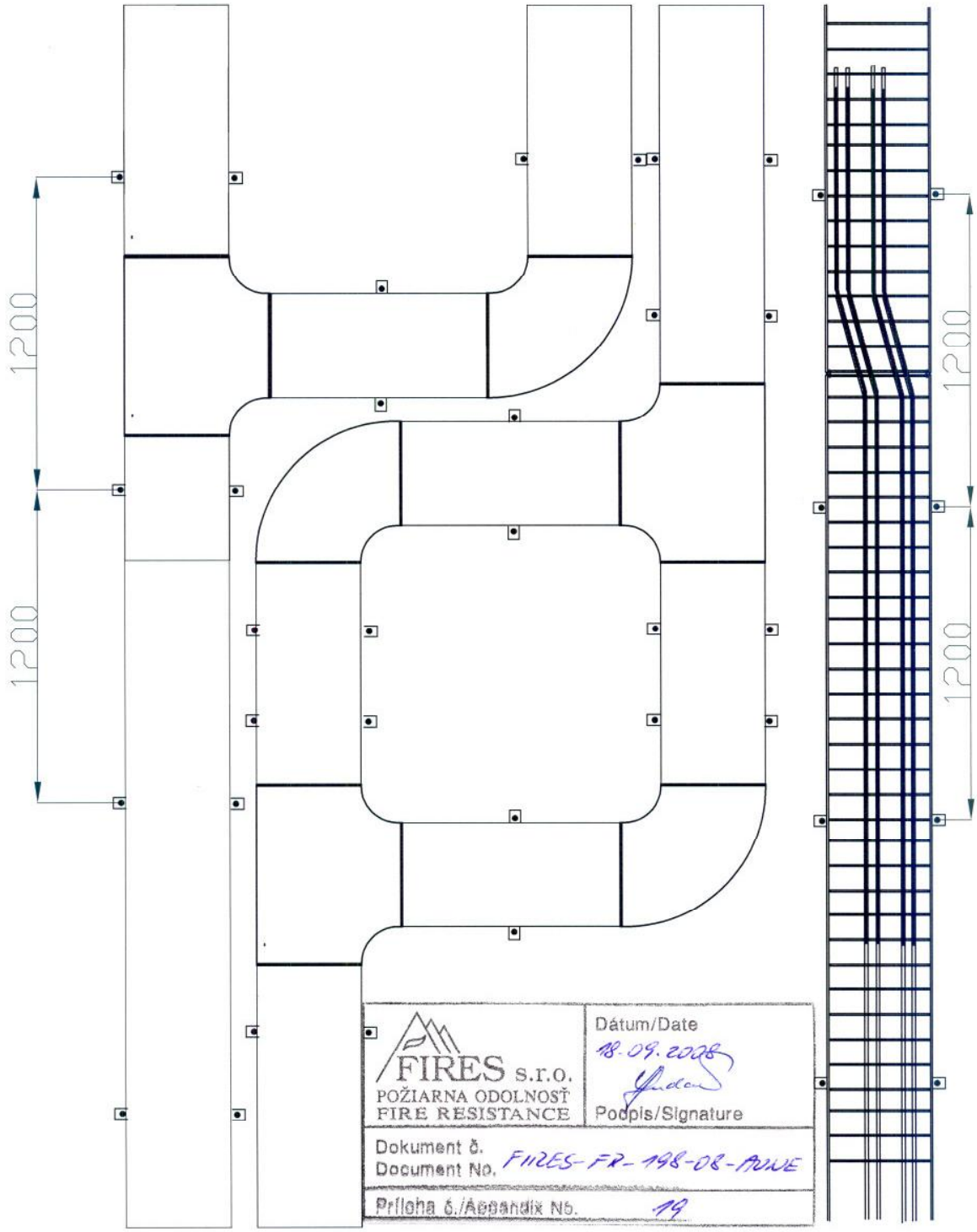
Document No. FIRES-FR-198-08-ONE

Príloha č./Appendix No. 18

Przekrój B-B

Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Przekładka	Format A4
			Nr normy	PN-EN 10327:2005			Arkusz
			półfabrykat (nr normy)				Arkuszy 5
Projektował				Nazwa rysunku			
Rysował	Nazwisko J.Grochowski	Podpis	Data 05-May-06				
Sprawdził							
Zatwierdził				Nr programu maszynowego			Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku Batizowce 18,09,2008			



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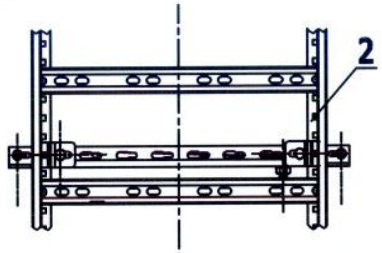
Dokument č.
Document No. FIRES-FR-198-08-ADDE

Príloha č./Appendix No. 19

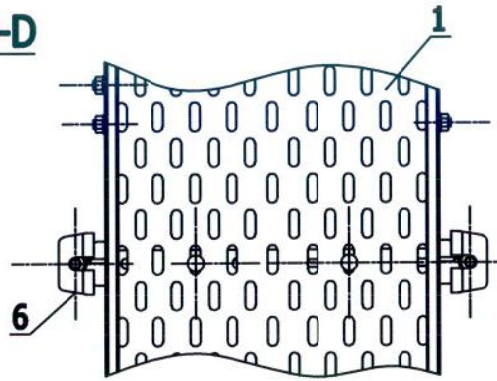
Przekrój C-C

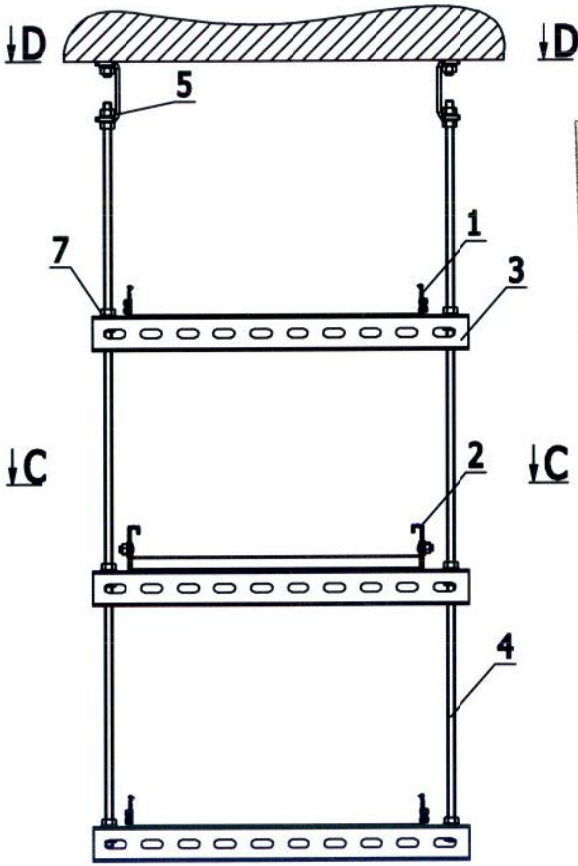
	Dachówka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005			Arkusz
				półfabrykat (nr normy)				Arkuszy 5
Projektował				Nazwa rysunku				
Rysował	Nazwisko J.Grochowski	Podpis	Data 05-May-06					
Sprawdził								
Zatwierdził				Nr programu maszynowego				Nr zmiany
	Profesjonalne Systemy Tras Kablowych			Nr rysunku Batizowce 18,09,2008				

C-C



D-D





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Dokument č. / Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 20

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
8	Śruba	PSRDM10x80	Stal cynkowana galwanicznie		804100
7	Uchwyt sufitowy	USDV	Ml.stal.cynk.net.zanurzeniowa PN-EN ISO 1461:2000		803700
6	Nakrętka	NS M10	Stal cynkowana galwanicznie		650244
5	Podkładka	PP 10	Stal cynkowana galwanicznie		650544
4	Pret gwintowany	PGM10/1	Stal cynkowana galwanicznie		651001
3	Ceownik wznocniony	CWDP40H40/05	Ml.stal.cynk.net.Sedzimira PN-EN10327:2005		804105
2	Drabinka	DGDP400H60/3N	Ml.stal.cynk.net.Sedzimira PN-EN10327:2005		863043
1	Koryto	KCDP400H60/3N	Ml.stal.cynk.net.Sedzimira PN-EN10327:2005		862040

gekonstruiert	M.Stamkowski	28.10.08	
gezeichnet	M.Stamkowski	28.10.08	
geprueft			

Massstab

RINNE KCDP400H60/3N
LEITER DGDP400H60/3N

fire

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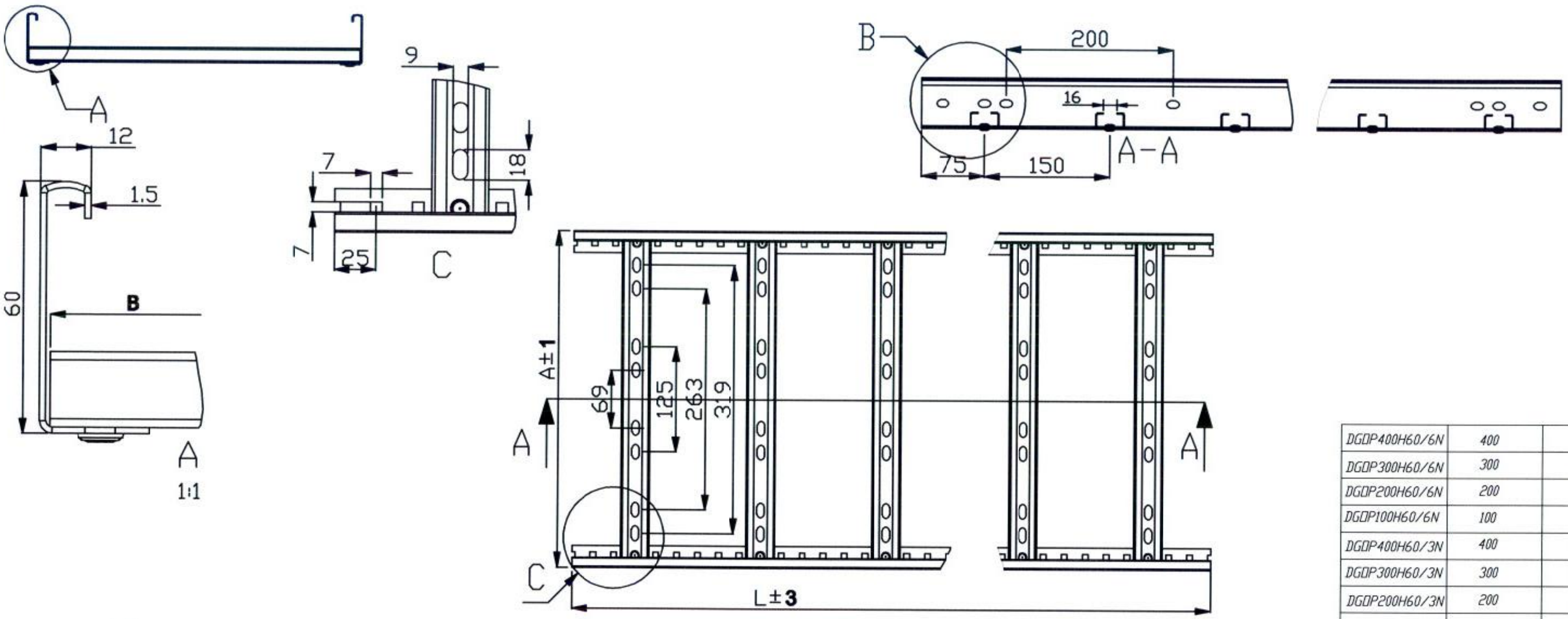
ul. Jagodne 5 05-480
Karczew

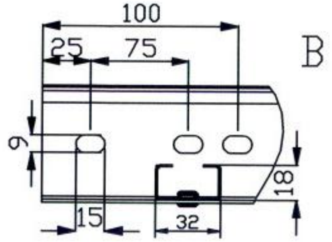
Blatt 1 von 1

Grosse A3

Name
Feuerbestandig System

Vorhaben forschen





Typ	Szerokość A (mm)	Długość L (mm)	Nr. Kat
DGOP400H60/6N	400	6000	863040
DGOP300H60/6N	300	6000	863030
DGOP200H60/6N	200	6000	863020
DGOP100H60/6N	100	6000	863010
DGOP400H60/3N	400	3000	863043
DGOP300H60/3N	300	3000	863033
DGOP200H60/3N	200	3000	863023
DGOP100H60/3N	100	3000	863013

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Dokument č.
Document No. FIRES-FR-198-08-AUNE

Príloha č./Appendix No. 21

Odchyłka wymiarów nietolerowanych	Grubość (mm) 1,5	Materiał: Gatunek	Blacha stal.cynkow.Sędzimira
		Nr normy	PN-EN 10327/2005
		półfabrykat (nr normy)	

	Nazwisko	Podpis	Data
Projektował	J.GROCHOWSKI		20.10.05
Rysował	J.Grochowski		20.10.05
Sprawdził	T.WŁODARCZYK		20.10.05
Zatwierdził	J.KLICZEK		20.10.05

Masa (kg) | Podziałka | Format A3 | Arkusz | Arkuszy

Nazwa rysunku: DGOP400H60/3N

Nr programu nasyconego: ---

Nr zmiany

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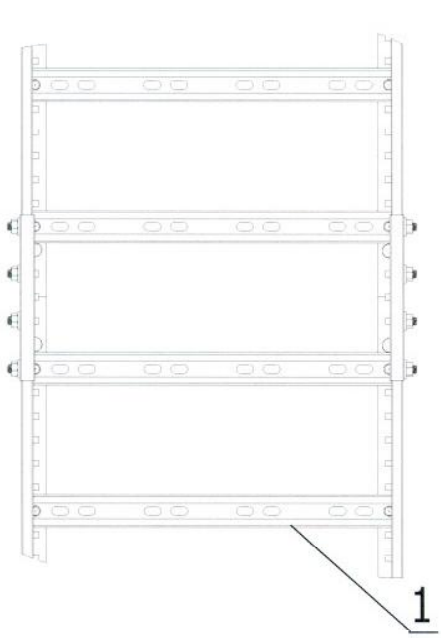

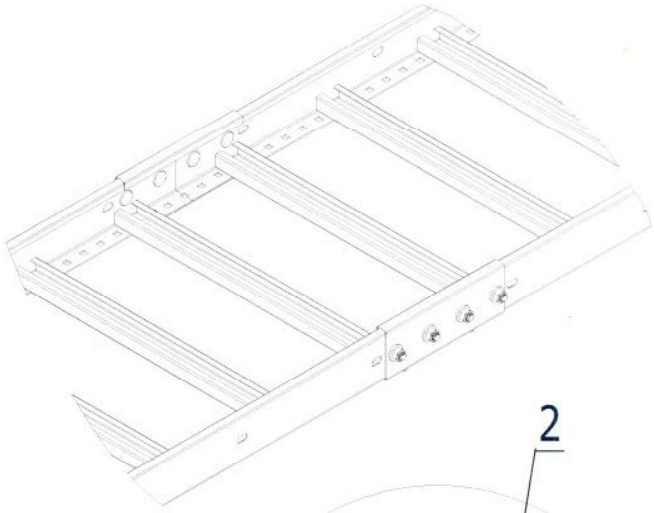

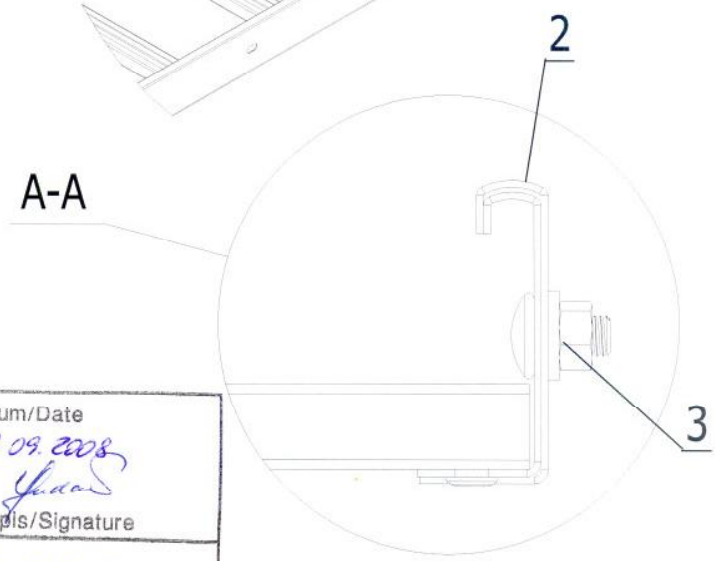

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Dokument č./Document No. FIRES-FR-198-08-NNE

Príloha č./Appendix No. 22

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
3	śruba	SGN M8x14	Stal cynkowana galwanicznie	8	650142
2	łącznik	LD□CH60N	PN-EN 10327:2005	2	863000
1	DRABINKA	DGD□P400H60/3N	PN-EN 10327:2005	1	863043

Dachylko wymiarów nietolerowanych

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

Masa [kg]

Podziałka: 1:200

Format: A4

Arkusz: 1

Arkuszy: 1

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

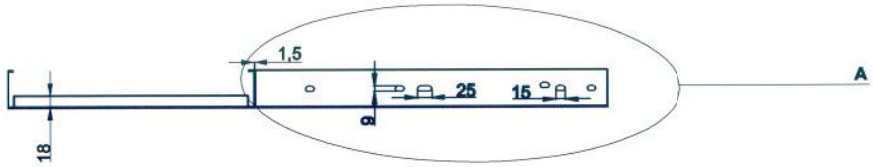
Nazwa rysunku

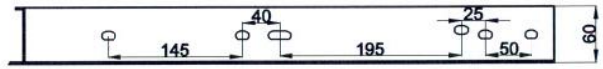
Nr programu maszynowego

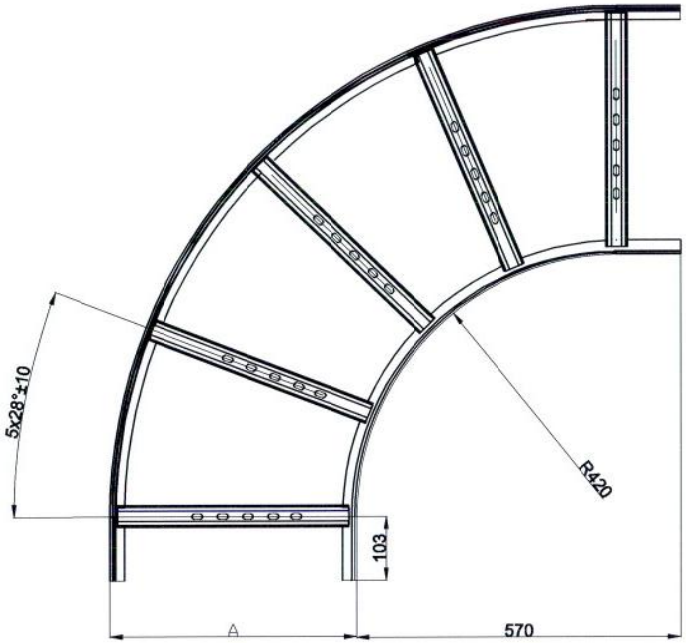
Nr rysunku

Nr zmiany

Profesjonalne Systemy Tras Kablowych







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
L.p.	Szerokość A (mm)	Grubość (mm)	Materiał (mm)	Masa(kg)	Nr katalogu

Dachyłka wymiarów nietolerowanych	Grubość (mm) —	Materiał (mm) —	Masa(kg) —	Podziałka 1:1

Projektował	M.Stawikowski	09.10.08	Nazwa rys.	Łuk drabinki 90°
Rysował	M.Stawikowski	09.10.08		LDOP....H60 N
Sprawdził				
Zatwierdził				

Profesjonalne Systemy Tras Kablowych

8655....

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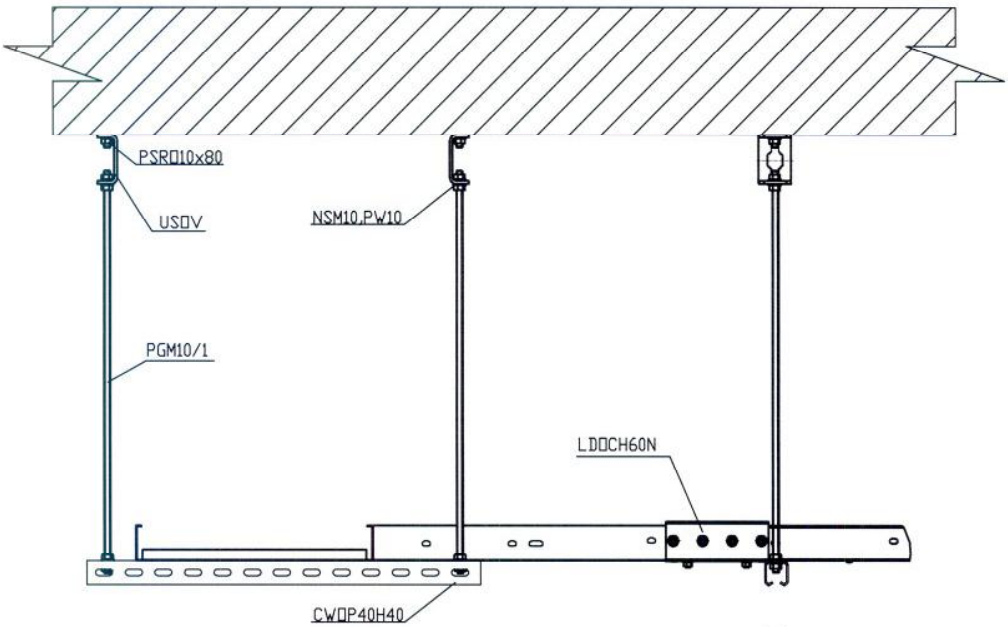
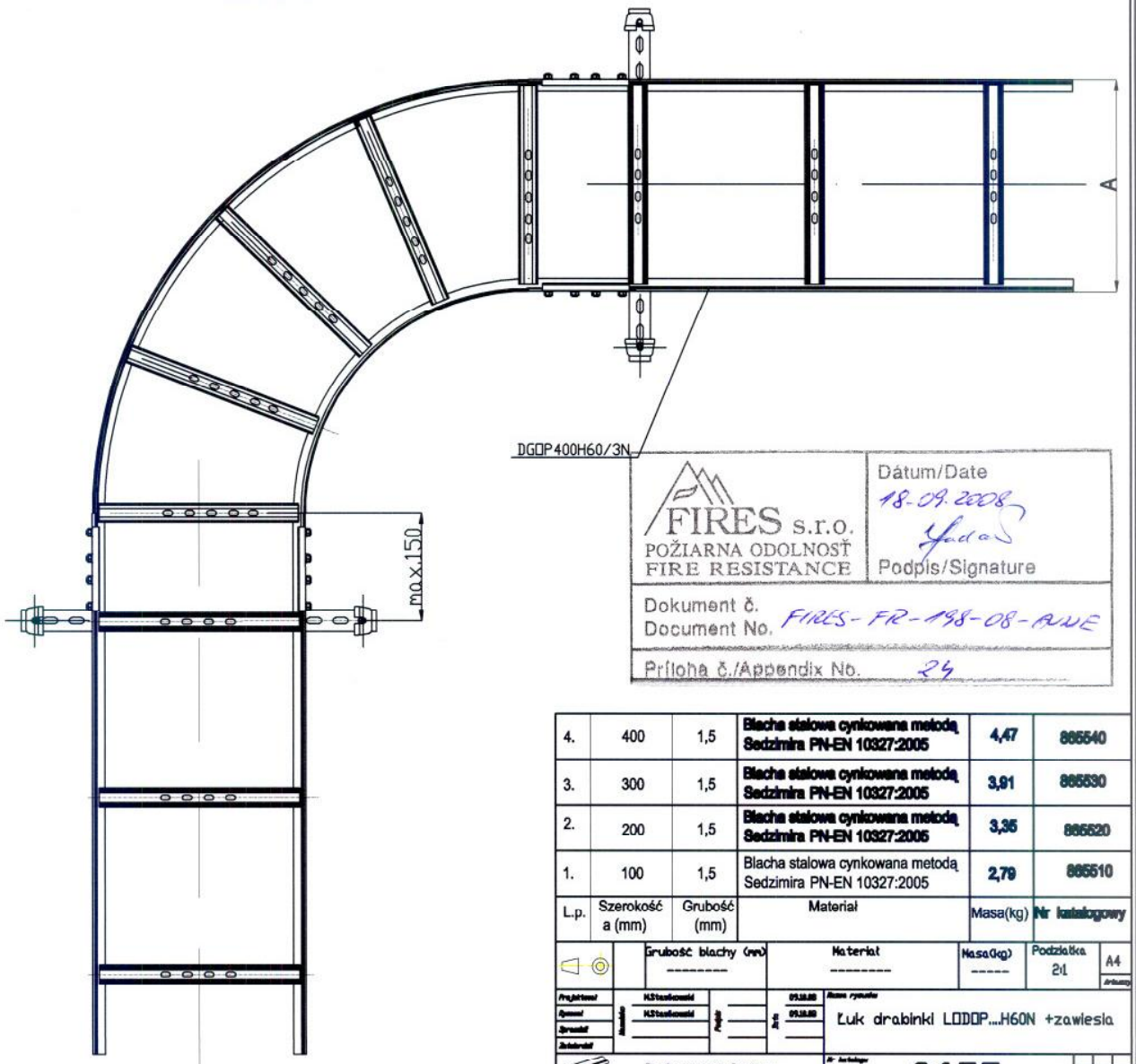
Príloha č./Appendix No. 23





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

Príloha č./Appendix No. 24

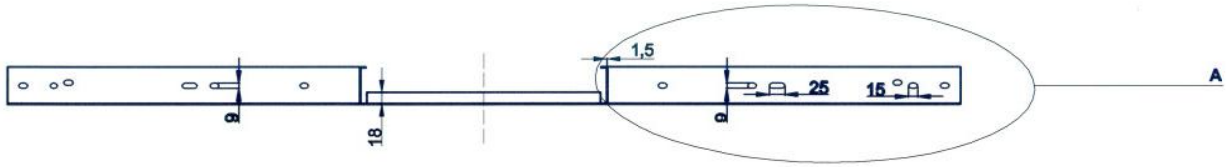
L.p.	Szerokość a (mm)	Grubość (mm)	Materiał	Masa(kg)	Nr katalogowy
4.	400	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	4,47	865540
3.	300	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	3,91	865530
2.	200	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	3,35	865520
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	2,79	865510

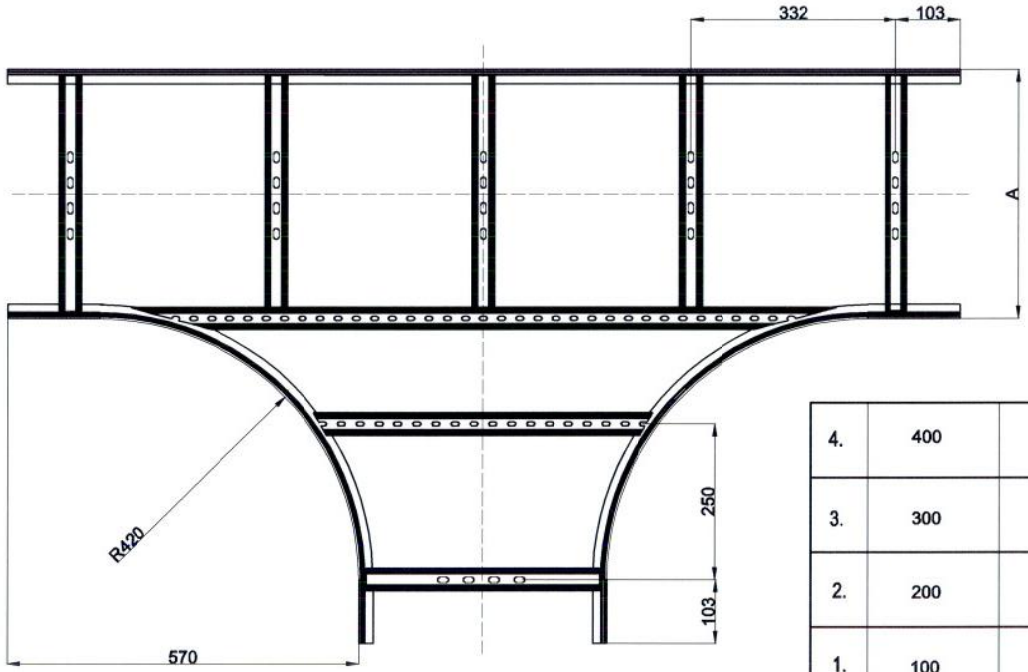
Grubość blachy (mm)	Materiał	Masa(kg)	Podziałka	
---	---	---	2:1	A4

Łuk drabinki LD□P...H60N +zawiesia

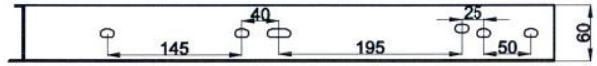
Profesjonalne Systemy Tras Kablowych

8655....





A-A



L.p.	Szerokość A (mm)	Grubość (mm)	Materiał (mm)	Masa(kg)	Nr katalogu
4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	6,75	865640
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	6,02	865630
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	5,29	865620
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	4,56	865610

Dachówka wymiarów nietolerowanych	Grubość (mm)	Materiał (mm)	Masa(kg)	Podziałka
	—	—	—	1:1

Projektował	M.Stawikowski		09.10.08
Rysował	M.Stawikowski		09.10.08
Sprawdził			
Zatwierdził			

Trójnik drabinki
TDOP...H60 N

Profesjonalne Systemy Tras Kablowych

Nr katalogu 8656....

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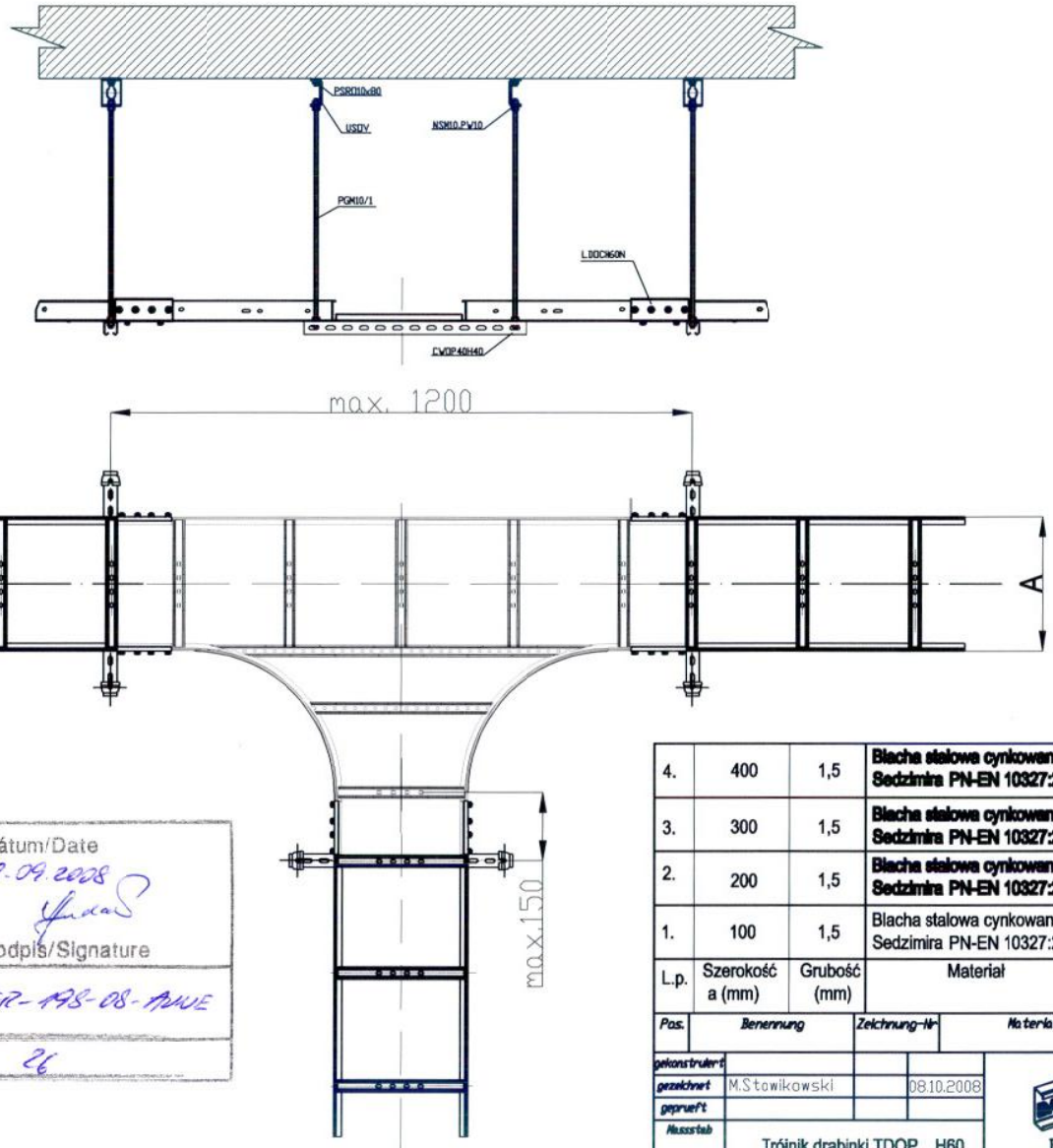
Príloha č./Appendix No. 25



4.	400	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**6,75**	**865640**
3.	300	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**6,02**	**865630**
2.	200	1,5	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**5,29**	**865620**
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	**4,56**	**865610**
L.p.	Szerokość a (mm)	Grubość (mm)	Materiał	Masa(kg)	**Nr katalogowy**

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
gekonstruiert					
gezeichnet	M.Stowikowski		08.10.2008		
geprueft					
Massstab 3:1	Trójnik drabinki TDOP....H60 +zawiesia				

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ul. Jagodne 5 05-480 Karczew

Blatt 1 von 1 | Grosse A3

Name

Vorhaben Forschen

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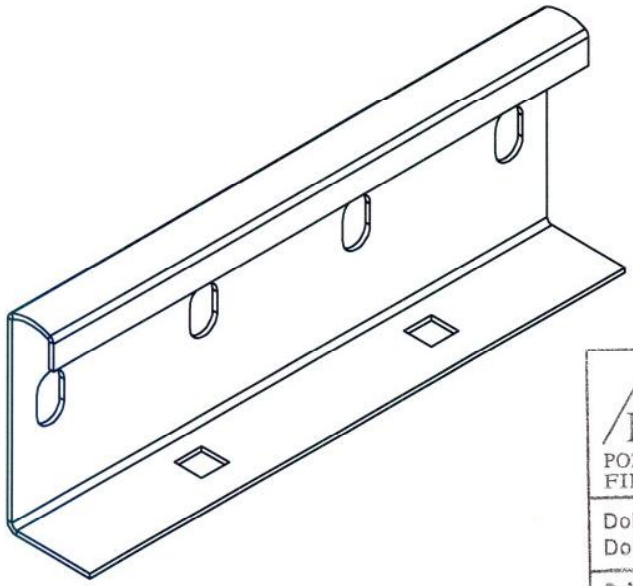
FIRE RESISTANCE

Dátum/Date 18.09.2008

Podpis/Signature

Dokument č./Document No. FIRES-FR-498-08-ANNE

Príloha č./Appendix No. 26



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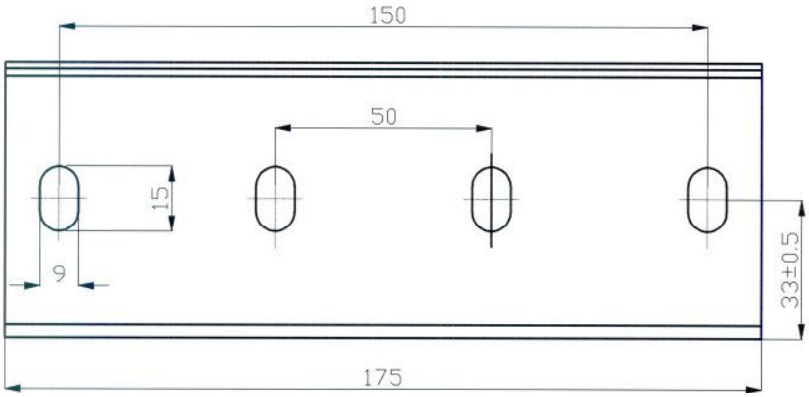
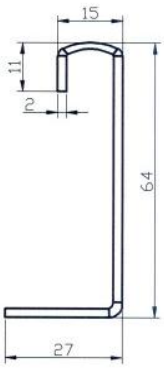
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

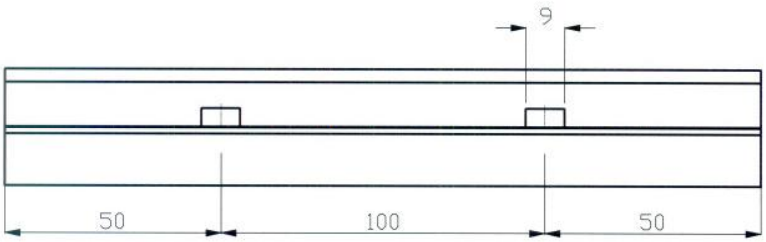
Dátum/Date 18.09.2008
Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-Příloha

Príloha č./Appendix No. 2





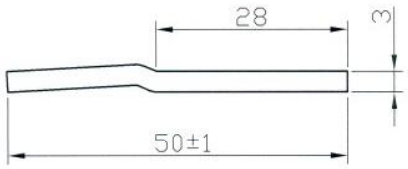


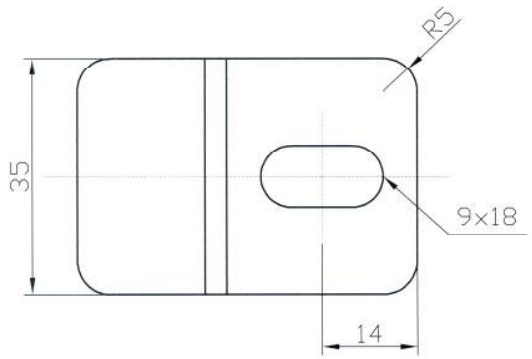
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek: Blach.stal.cynk.met.Sendzimira	Masa [kg]	Podziałka	Format A4
				Nr normy: PN-EN 10327:2005			Arkusz
				półfabrykat (nr normy)			Arkuszy

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

Profesjonalne Systemy
Tras Kablowych

Nr rysunku: 863000





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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 18.09.2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 28

	Odchyłka wymiarów nietolerowanych	±0,5	Materiał	Gatunek	-----	Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005	0,04	1:1	Arkusz --
				półfabrykat (nr normy)	-----			Arkuszy --

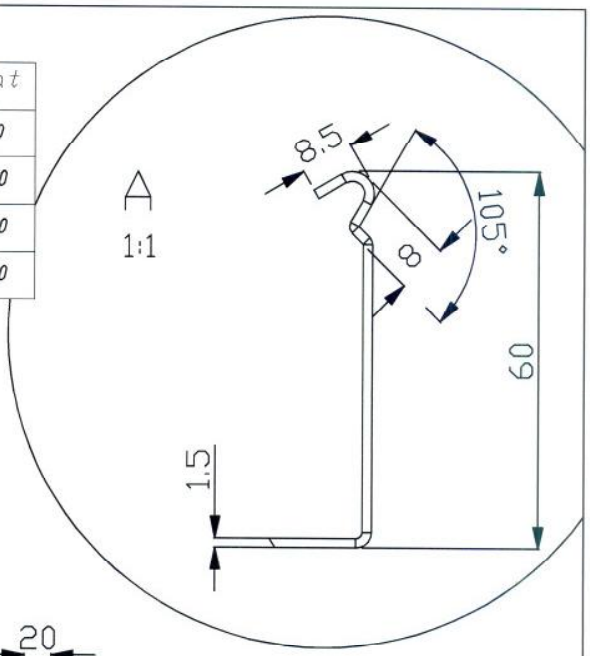
	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	Tomasz Grudniewski		29.12.04	ZMOE
Rysował	Jakub Rudak		20.02.08	
Sprawdził	Jacek Kliczek		20.02.08	
Zatwierdził	Jacek Kliczek		20.02.08	Nr zmiany

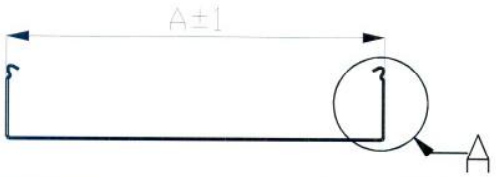
BAKS

Profesjonalne Systemy Tras Kablowych

Nr rysunku 802900

Typ	Szerokość A(mm)	Długość L(mm)	Nr.kat
KCOP100H60/3N	100	3000	862010
KCOP200H60/3N	200	3000	862020
KCOP300H60/3N	300	3000	862030
KCOP400H60/3N	400	3000	862040





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FIRE RESISTANCE

Dátum/Date 18.09.2008

Podpis/Signature

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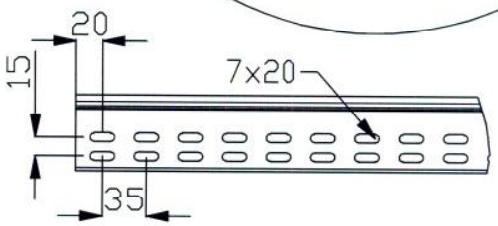
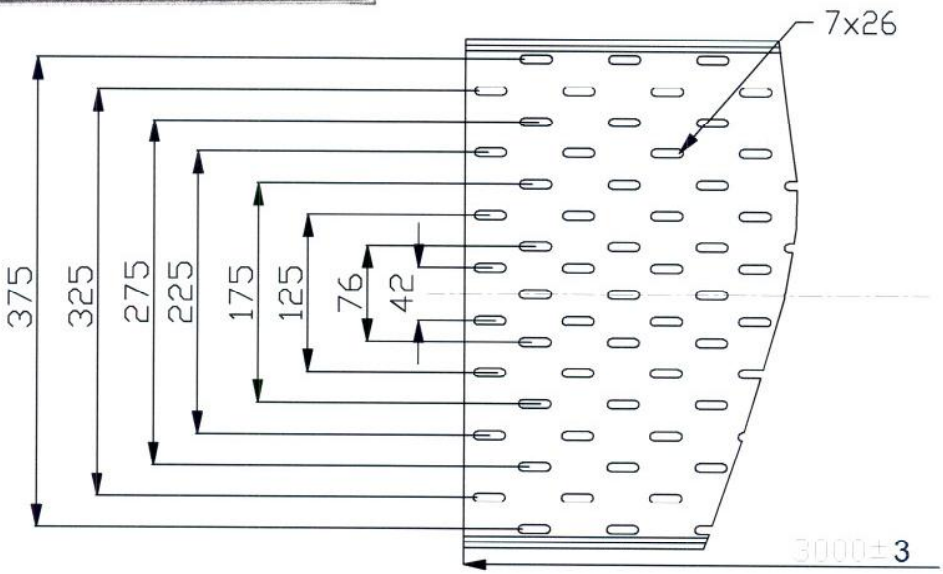
Príloha č./Appendix No. 29





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

	Nazwisko	Podpis	Data
Projektował	J.GROCHOWSKI		20.10.05
Rysował	J.Grochowski		20.10.05
Sprawdził	T.WŁODARCZYK		20.10.05
Zatwierdził	J.KLICZEK		20.10.05

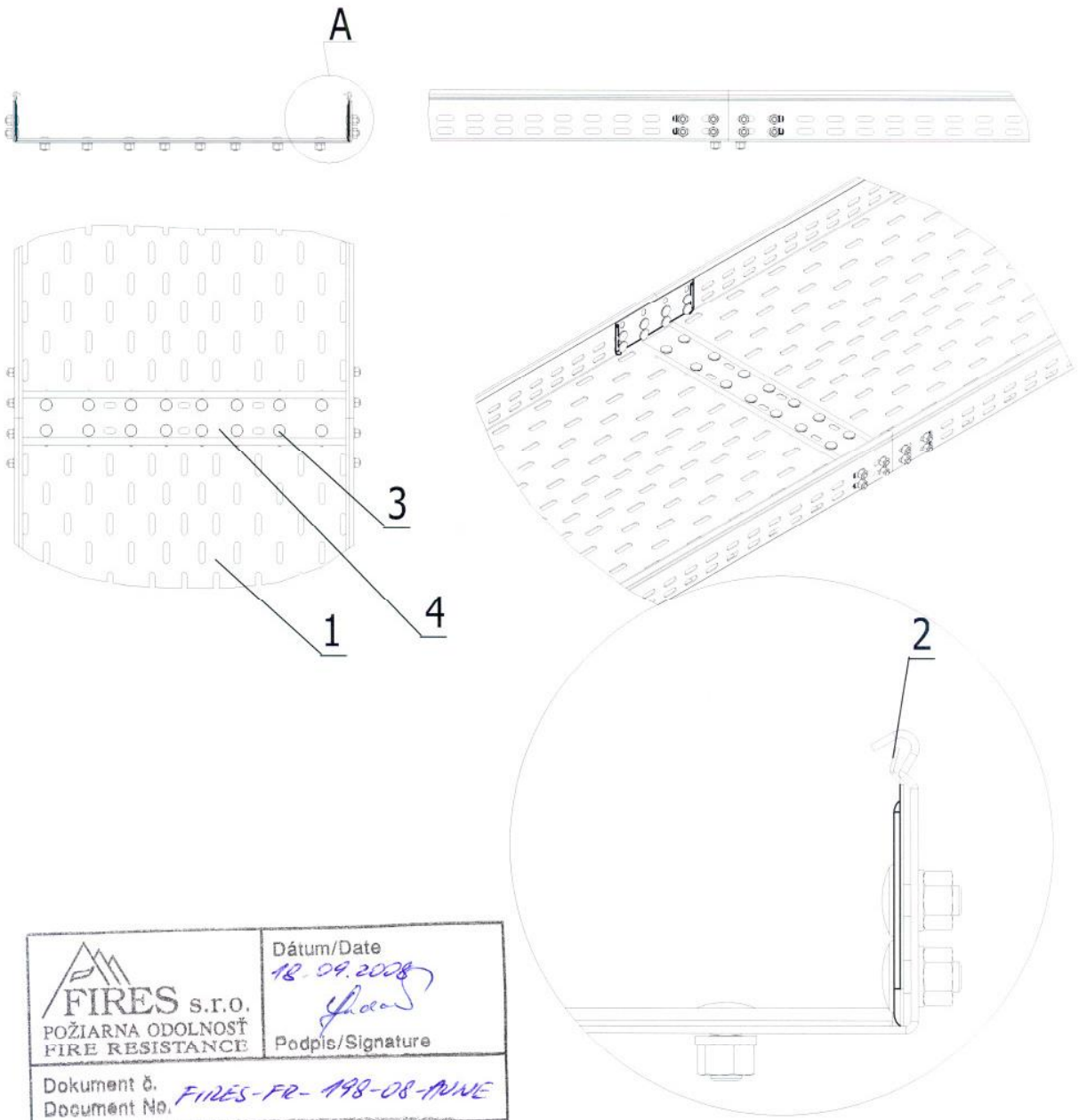
Nazwa rysunku: KCOP....H60/3N

Nr programu maszynowego

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 862040



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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 18. 09. 2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 30

Pos.	Benennung	Zeichnung-Nr	Material	Stck.	Katalogs Nr.
4	Blacha lacznikowa	BL□400N		1	862440
3	śruba	SGN M6x12		32	650442
2	łącznik	LP□PH60N		2	860700
1	koryto	KC□P400H60/3N		1	862040

Odchyłka wymiarów nietolerowanych

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

Masa [kg]

Podziałka 1:200

Format A4

Arkusz 1

Arkuszy 1

Projektował			
Rysował	J.Grochowski	21-Nov-06	
Sprawdził			
Zatwierdził			

Nazwisko | Podpis | Data

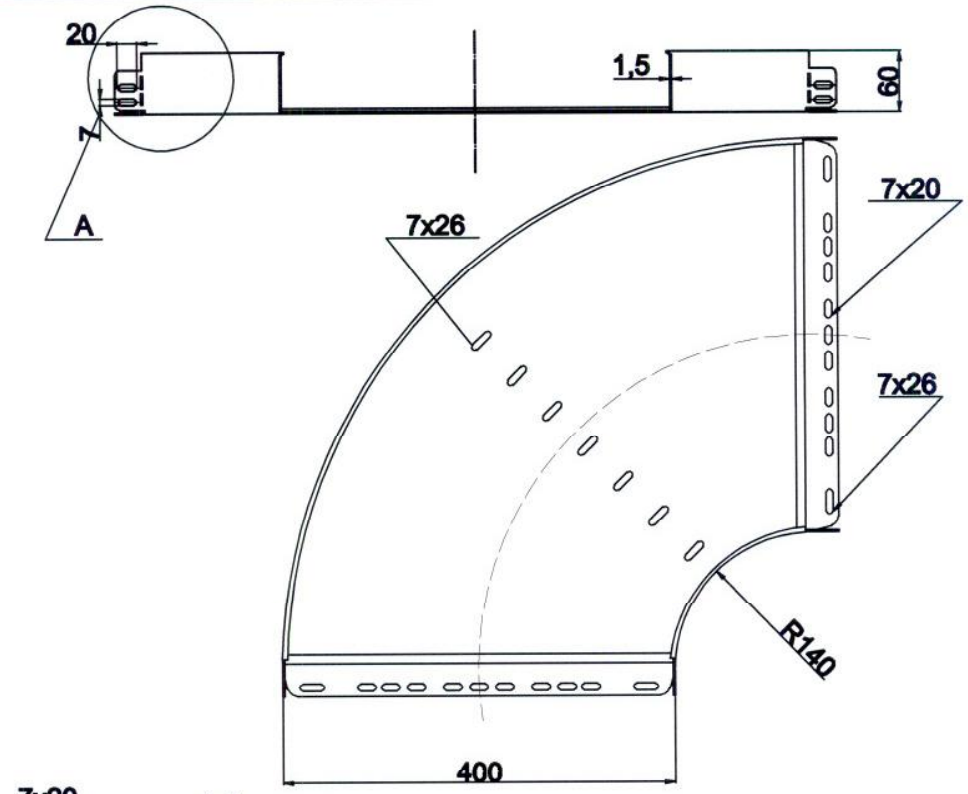
Nazwa rysunku

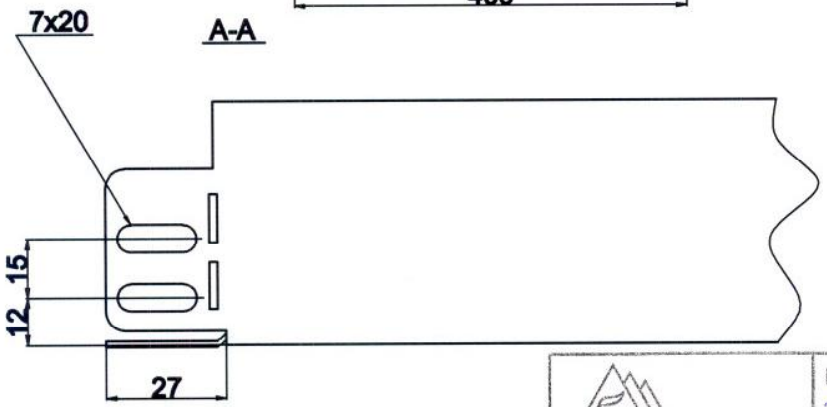
Nr programu maszynowego

Nr rysunku

Nr zmiany

Profesjonalne Systemy Tras Kablowych





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Dokument č. / Document No. FIRES-FR-198-08-ANJE

Príloha č./Appendix No. 39

L.p.	Szerokość a (mm)	Grubość (mm)	Materiał (mm)	Masa (kg)	Nr katalogu
4.	400	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	3,44	865040
3.	300	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	2,48	865030
2.	200	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	1,60	865020
1.	100	1,5	Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005	0,90	865010

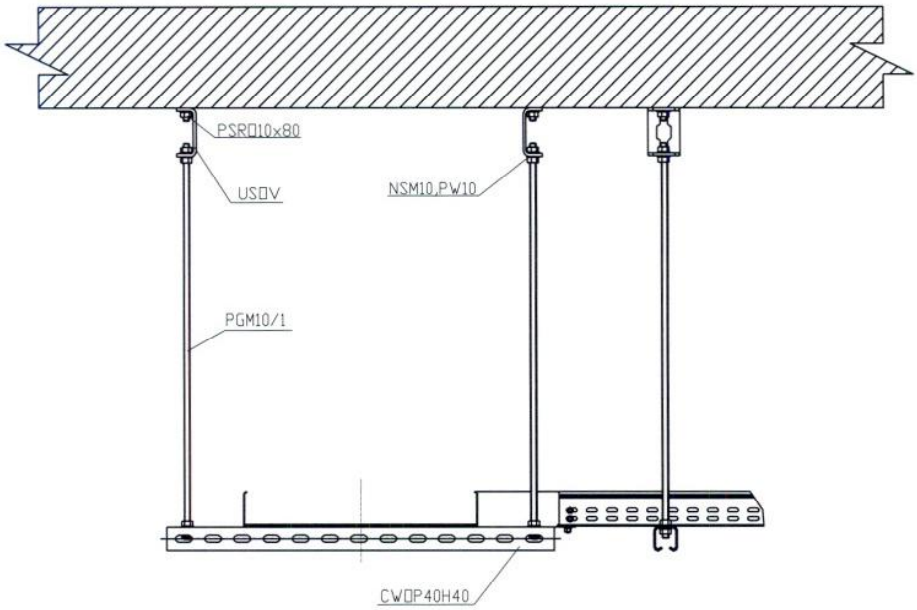
Grubość blachy (mm)	Materiał	Masa (kg)	Podziałka	
—	—	—	1:1	A4

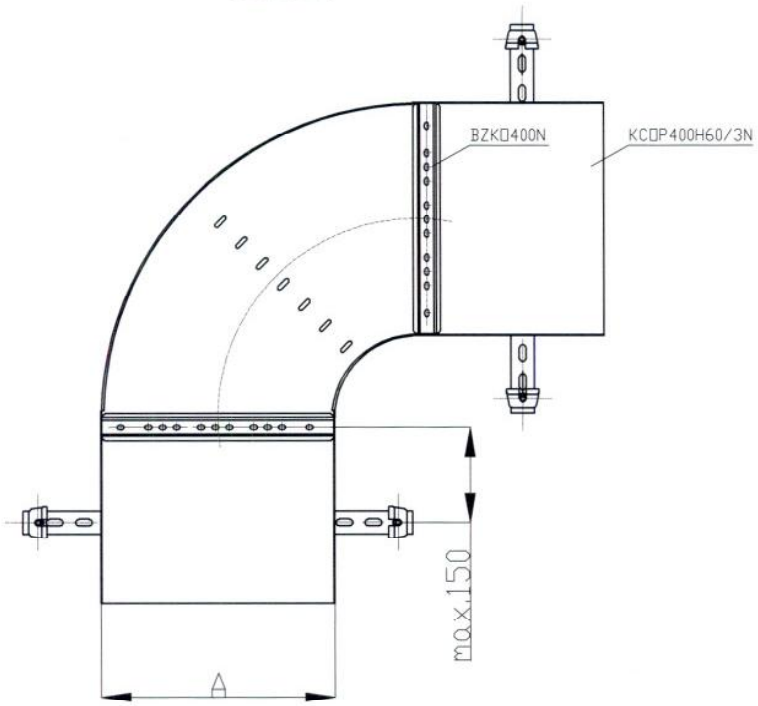
	Nazwisko	Podpis	Data
Projektował	M.Stawikowski		09.10.08
Rysował	M.Stawikowski		09.10.08
Sprawdził			
Zatwierdził			

Nazwa grupy: Kolanko korytka KKPOP...H60

Profesjonalne Systemy Tras Kablowych

Nr katalogu: 8650....





4.	400	1,5	Blacha stalowa cynkowana metodą Sendzimira PN-EN 10327:2005	3,44	865040
3.	300	1,5	Blacha stalowa cynkowana metodą Sendzimira PN-EN 10327:2005	2,48	865030
2.	200	1,5	Blacha stalowa cynkowana metodą Sendzimira PN-EN 10327:2005	1,80	865020
1.	100	1,5	Blacha stalowa cynkowana metodą Sendzimira 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	A4
	-----	-----	-----	1:1	Arkuszy

Projektował: M.Stawikowski
Rysował: M.Stawikowski
Sprawdził:
Zatwierdził:
Data: 10.10.08 / 10.10.08

Nazwa rysunku: Kolanko korytka KKP□P400H60 +zawiesia

Profesjonalne Systemy Tras Kablowych

Nr katalogu: 8650....

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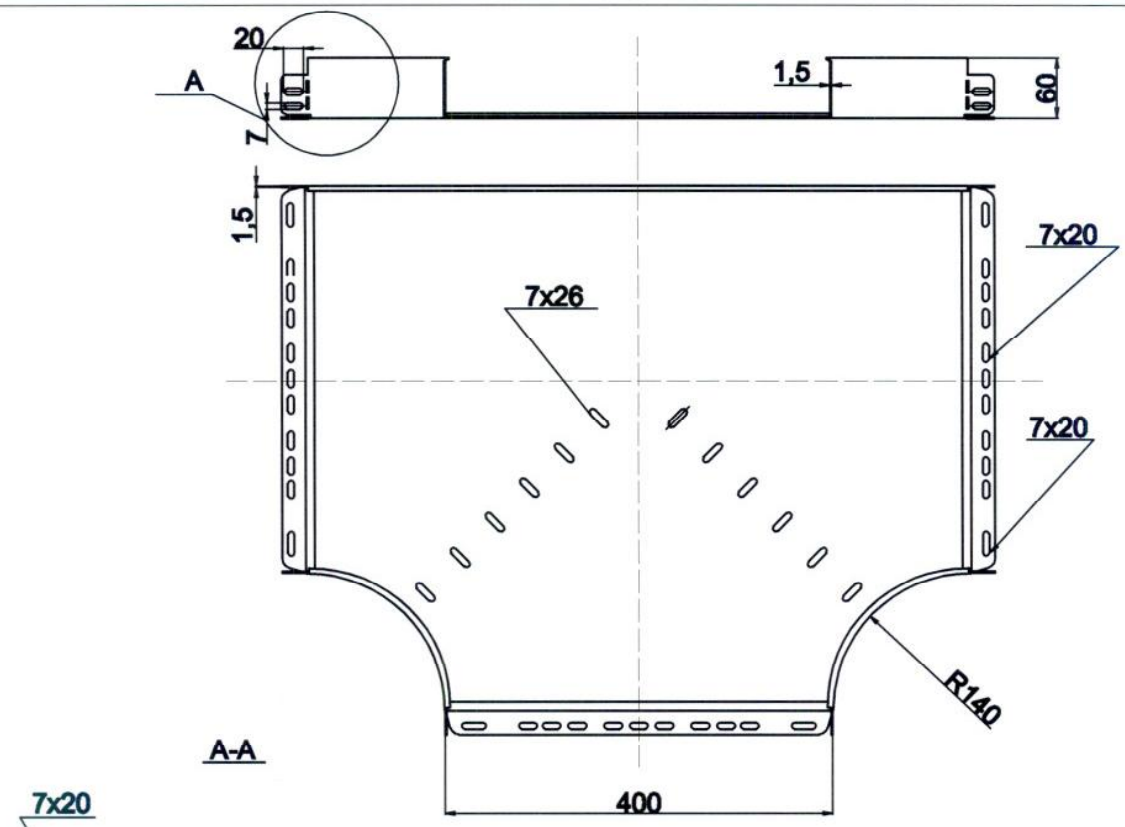
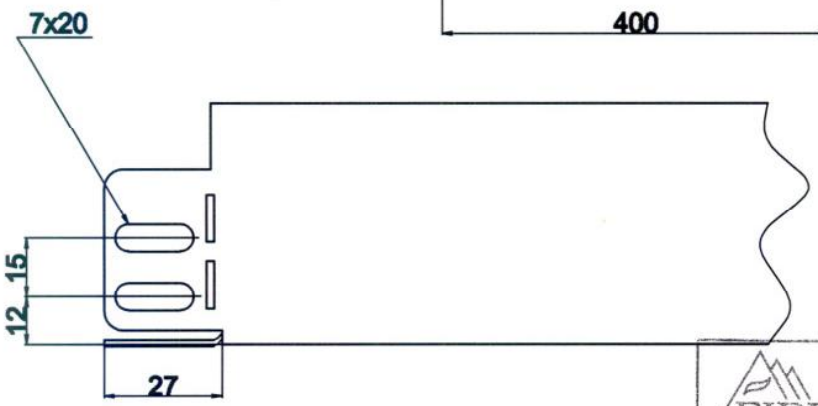
Podpis/Signature

Dokument č./Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 32





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FIRE RESISTANCE

Dátum/Date 18.09.2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ADUE

Príloha č./Appendix No. 33

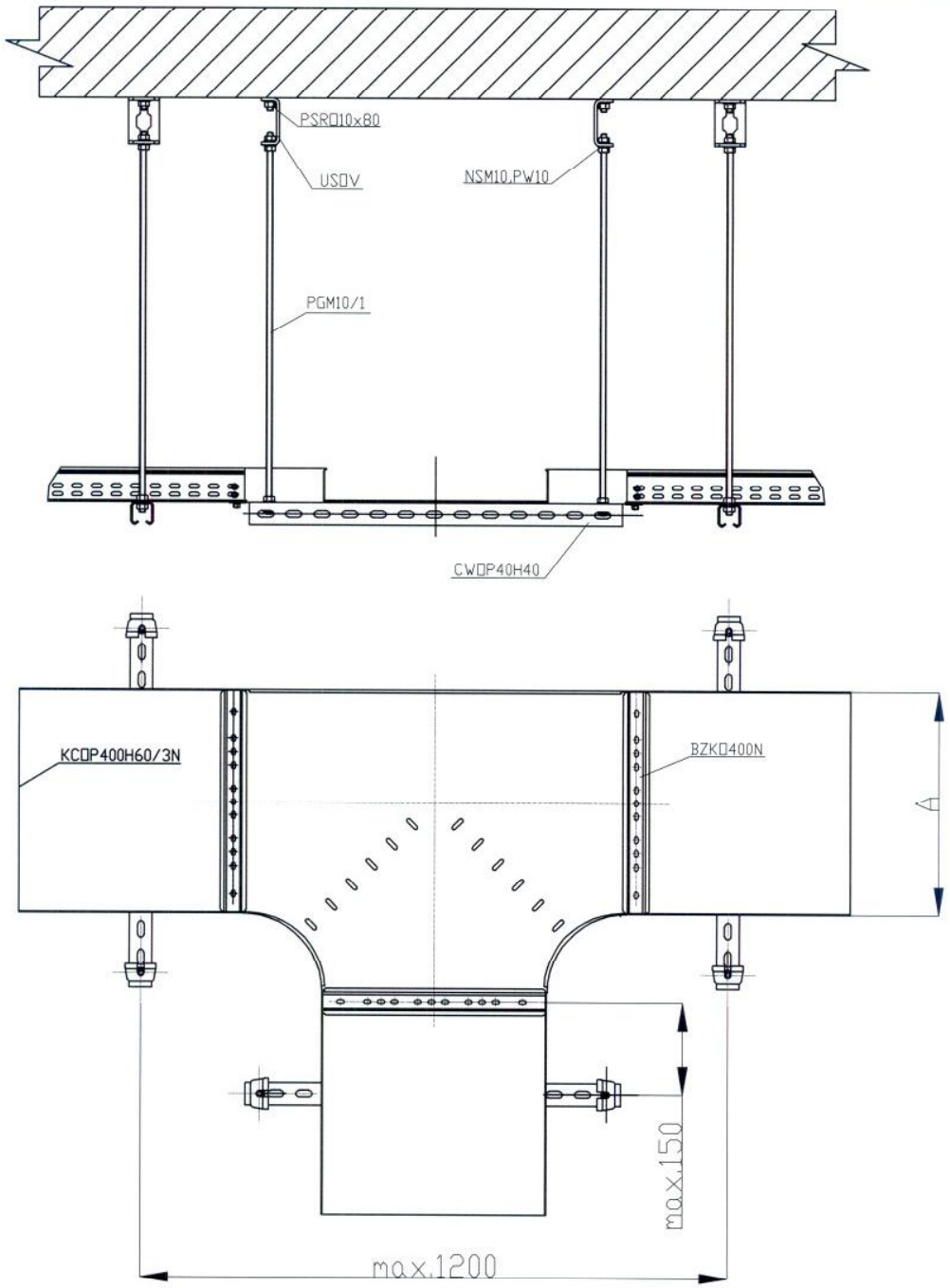
4.	**400**	**1,5**	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**5,18**	**865240**
3.	**300**	**1,5**	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**3,71**	**865230**
2.	**200**	**1,5**	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**2,48**	**865220**
1.	**100**	**1,5**	**Blacha stalowa cynkowana metodą Sedzimira PN-EN 10327:2005**	**1,84**	**865210**
L.p.	Szerokość a (mm)	Grubość (mm)	Materiał (mm)	Masa (kg)	Nr katalogu

Grubość blachy (mm)	Materiał	Masa (kg)	Podziałka	
—	—	—	1:1	A4

Projektował	M.Stawikowski		09.10.08	Nazwa grupy: Trójnik korytka TKPOP....H60
Rysował	M.Stawikowski		09.10.08	
Sprawdził				
Zatwierdził				

Profesjonalne Systemy Tras Kablowych

Nr katalogu: 8652...



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
L.p.	Szerokosc A (mm)	Grubosc (mm)	Material	Masa(kg)	Nr katalogu

	Grubość (mm) -----	Material -----	Masa (kg) -----	Podziałka 1:1	A4

Projektował	M.Stawikowski	10.10.08	Nazwa rysunku: Trójnik korytka TKP□P400H60 +zawiesia
Rysował	M.Stawikowski	10.10.08	
Sprawdził			
Zatwierdził			

Profesjonalne Systemy Tras Kablowych

Nr katalogu: 8652....

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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

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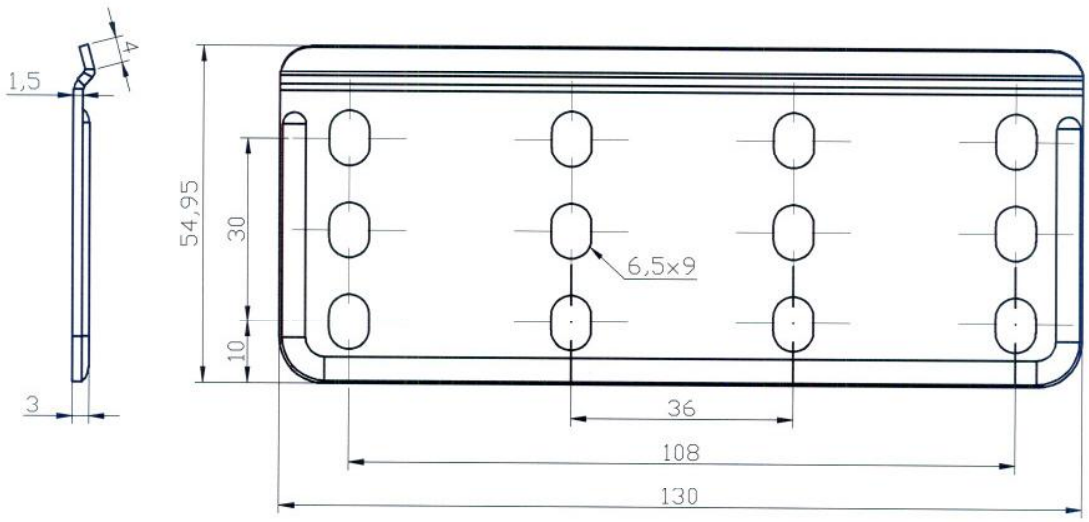
Podpis/Signature

Dokument č./Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 34



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FIRE RESISTANCE

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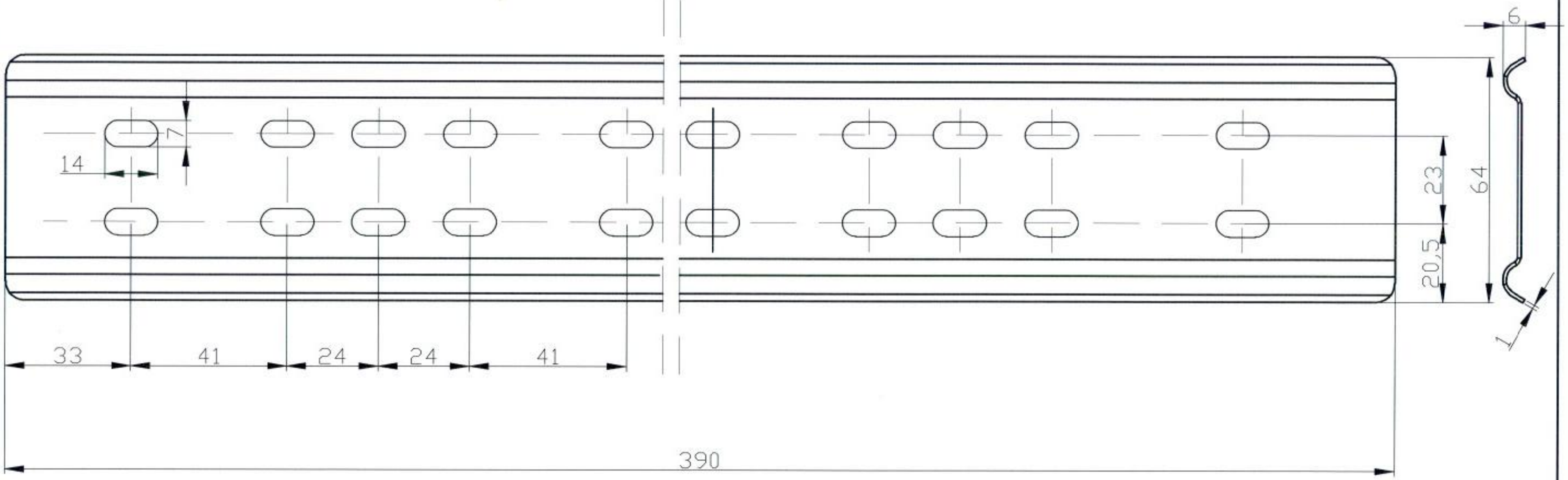
18-09-2008
Podpis/Signature

Dokument č.
Document No. FIRES-FR-498-08-ARNE

Príloha č./Appendix No. 35

	Odchylka wymiarów nietolerowanych		Materiał	Gatunek	Blach. stal.cynk.met.Sędzimira	Masa [kg]	Podziałka 1:1	Format A4
				Nr normy	PN-EN 10327:2005			Arkusz
				półfabrykat (nr normy)				Arkuszy
Projektował	J.GROCHOWSKI		Data	20.10.05	Nazwa rysunku			
Rysował	J.Grochowski			20.10.05	LPOPH60N			
Sprawdził	T.WLODARCZYK			20.10.05				
Zatwierdził	J.KLICZEK			20.10.05				Nr zmiany
Profesjonalne Systemy Tras Kablowych					Nr rysunku 860700			



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FIRE RESISTANCE

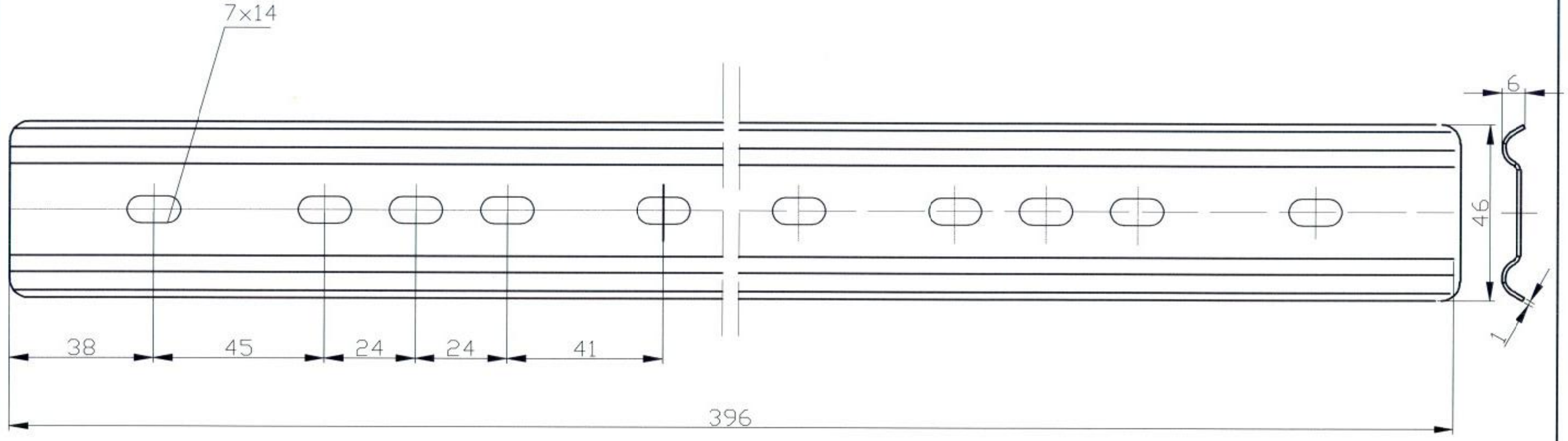
Dátum/Date 18. 09. 2008

Podpis/Signature

Dokument č.
Document No. FIRES-FR-198-08-AUWE

Príloha č./Appendix No. 36

Odchyłka wymiarów nietolerowanych		Gatunek: Blacha stal.cynk.net.Sedzimira	Masa [kg]: 0,24	Podziałka: 1:1	Format A3
		Nr normy: PN-EN 10327:2005			Arkusz
		półfabrykat (nr normy)			Arkuszy
Projektował	J.GROCHOWSKI	20.10.05	Nazwa rysunku: BL□400N		
Rysował	J.Grochowski	20.10.05			
Sprawdził	T.WLODARCZYK	20.10.05			
Zatwierdził	J.KLICZEK	20.10.05	Blacha łącznikowa		Nr zmiany
Profesjonalne Systemy Tras Kablowych			Nr rysunku: 862440		



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Dokument č. Document No. FIRES-FR-198-08-AUNE	
Príloha č./Appendix No. 34	

Projektował	J.GROCHOWSKI	20.10.05
Rysował	J.Grochowski	20.10.05
Sprawdził	T.WLODARCZYK	20.10.05
Zatwierdził	J.KLICZEK	20.10.05

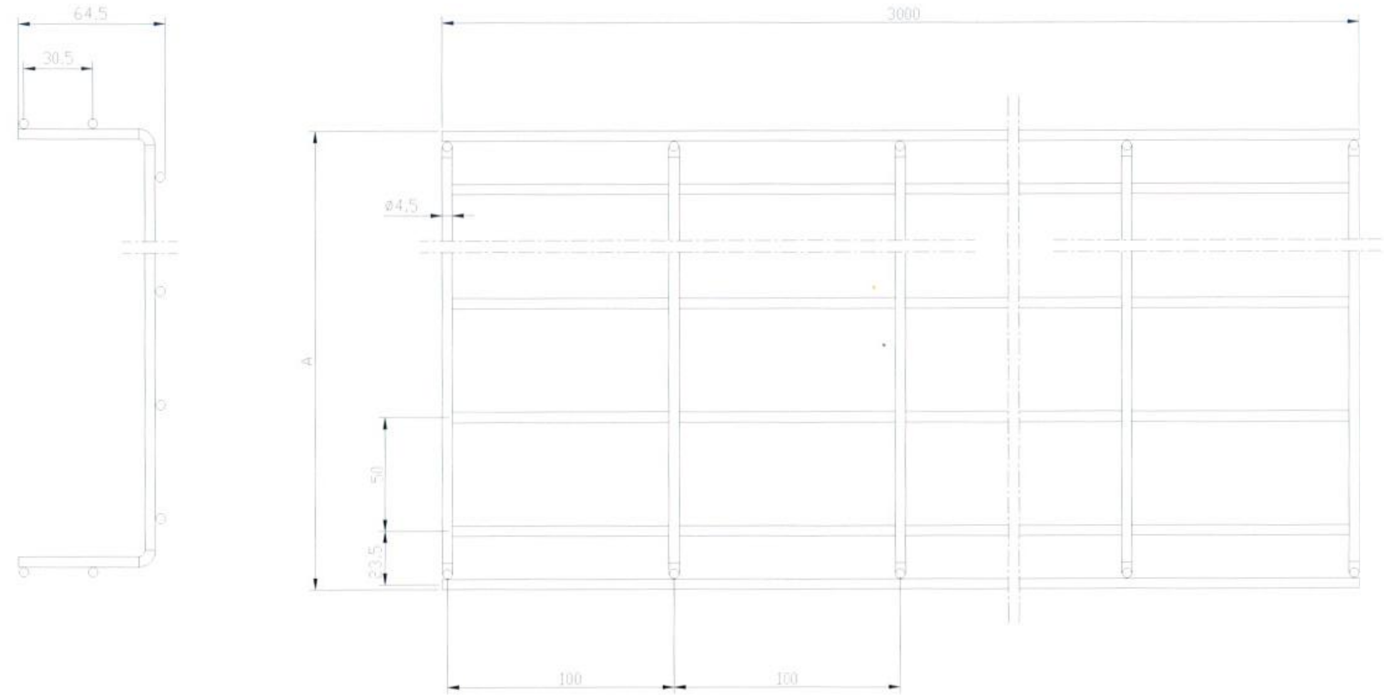
Gatunek: Blacha stalcynkowa Sendzimira
Nr normy: PN-EN 10327:2005
Masa [kg]: 0,16
Podziałka: 1:1
Format: A3

Nazwa rysunku: BZK□400N

Blacha zakończeniowa

Nr rysunku: 862540

Profesjonalne Systemy Tras Kablowych



LP	Nazwa wyrobu	Symbol	Nr katalogowy	A	Uwagi
5	Korytko siatkowe	KDSD400H60/3	864040	400	
4	Korytko siatkowe	KDSD300H60/3	864030	300	
3	Korytko siatkowe	KDSD200H60/3	864020	200	
2	Korytko siatkowe	KDSD150H60/3	864015	150	
1	Korytko siatkowe	KDSD100H60/3	864010	100	

Odchyłki wymiarów nietolerowanych	Materiał: Gatunek: Ocynk galwaniczny; Nr normy: ---; półfabrykat (nr normy): ---	Masa [kg]	Podziałka: 1:1	Format A3; Arkusz; Arkuszy
Projektował: J.GROCHOWSKI	Data: 2010.05	Nazwa rysunku: KDSD...H60/3		
Rysował: J.Grochowski	Data: 2010.05			
Sprawdził: T.WLODARCZYK	Data: 2010.05			
Zatwierdził: J.FLICZEK	Data: 2010.05			Nr zmiany
BAKS® Profesjonalne Systemy Tras Kablowych		Nr rysunku: 8640......		

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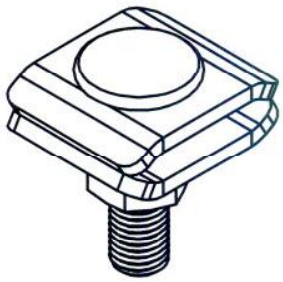
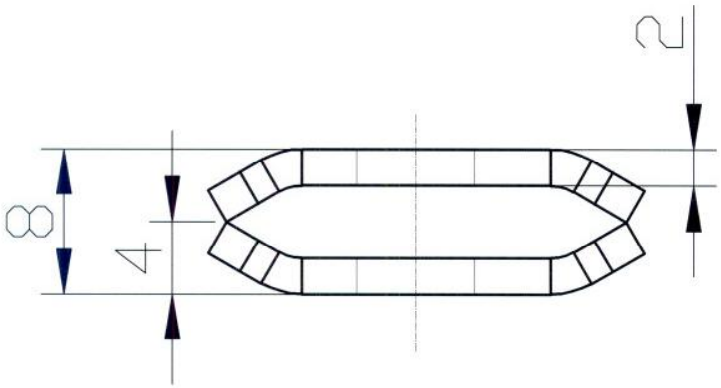
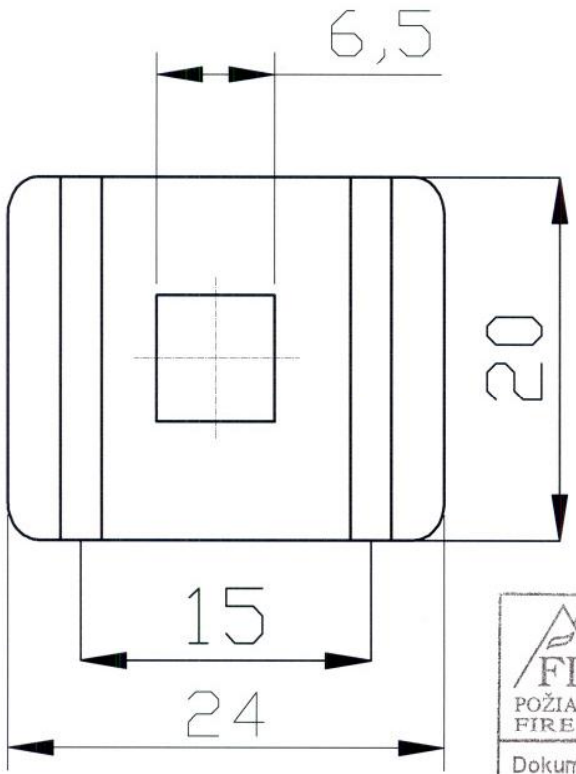
Document No. FIRES-FR-198-08-AUNE

Príloha č./Appendix No. 38







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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 18. 09. 2008
Podpis/Signature

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Príloha č./Appendix No. 39

	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	Blacha stal. cynk. met. Sędzimira	Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005	0,03	1:1	Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	M.Stawikowski		10.12.2007	Ucwyt śrubowy USS□
Rysował	M.Stawikowski			
Sprawdził				
Zatwierdził				Nr programu maszynowego ---

Profesjonalne Systemy Tras Kablowych

Nr rysunku 806000

Nr zmiany

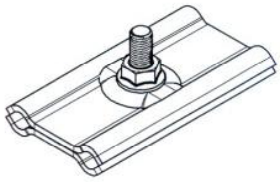
FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

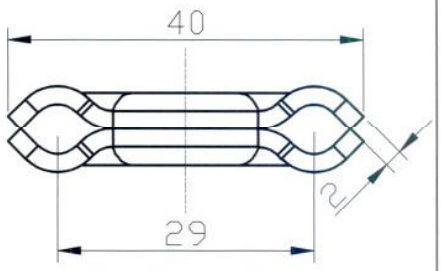
Dátum/Date 18.09.2008

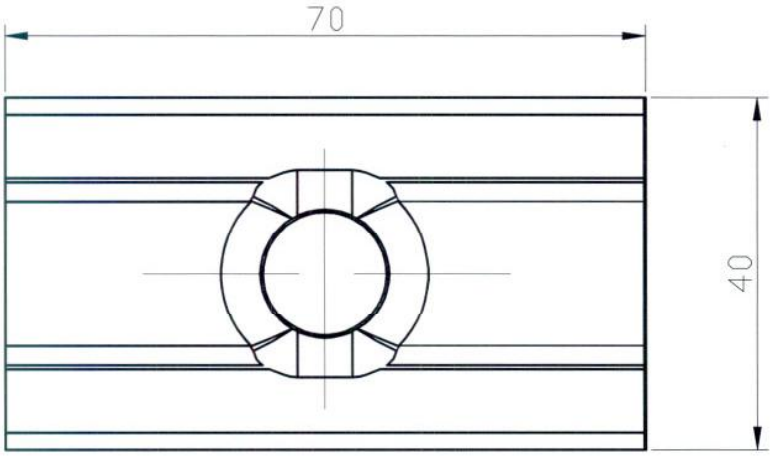
Podpis/Signature

Dokument č./Document No. FIRES-FR-198-08-ADDE

Príloha č./Appendix No. 40







Odchyłka wymiarów nietolerowanych		Materiał: Gatunek	Blacha stalcynk.net.Sędziszów	Masa [kg]	Podziałka	Format	A4
		Nr normy	PN-EN 10327:2005	0,07		Arkusz	
		półfabrykat (nr normy)				Arkuszy	

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	M.Stawikowski		20.10.05	Uchwyt śrubowy USSPW□
Rysował	M.Stawikowski		20.10.05	
Sprawdził			20.10.05	
Zatwierdził			20.10.05	Nr zmiany

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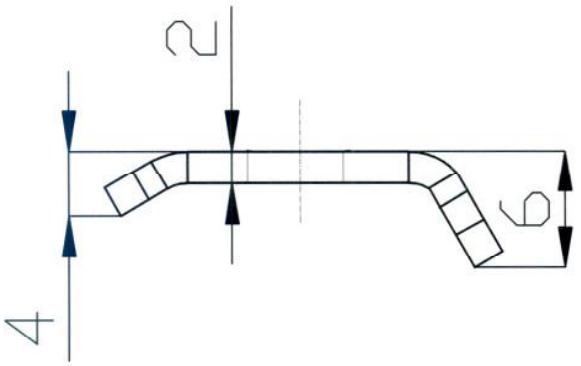
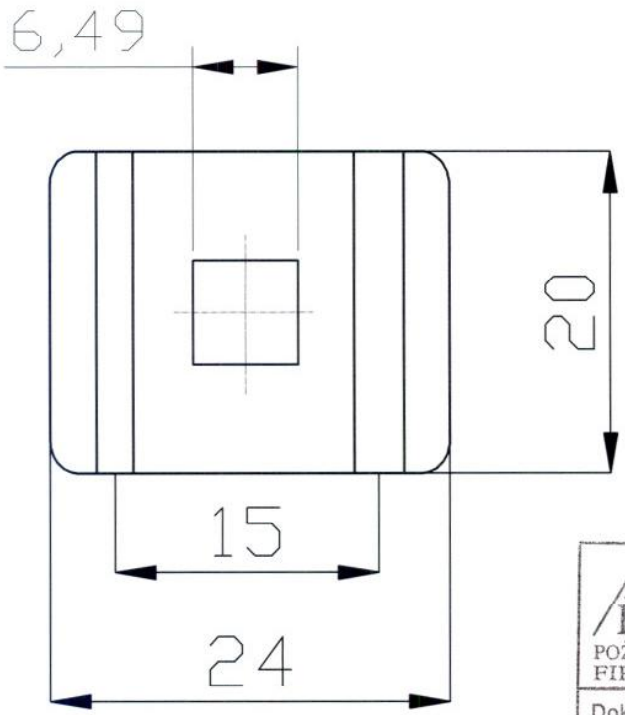
Tras Kablowych

Nr rysunku 806200





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FIRE RESISTANCE

Dátum/Date 18. 09. 2025
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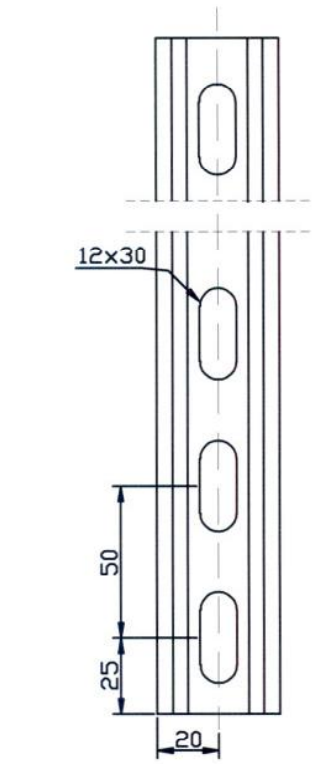
Príloha č./Appendix No. 41

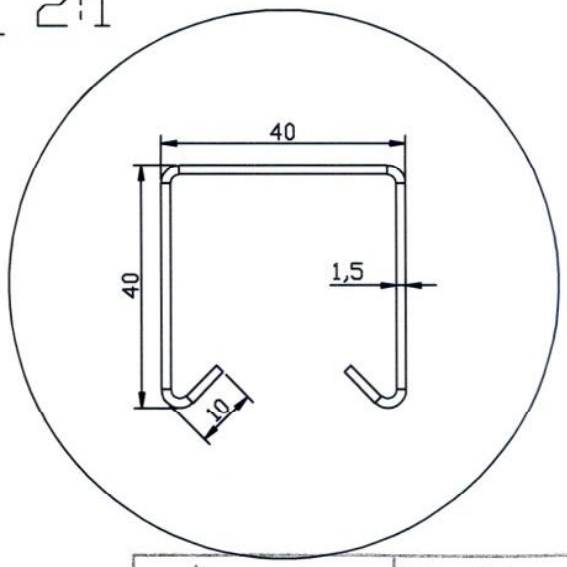
Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	Blachstalcynk.net.Sendzimira	Masa [kg]	Podziałka	Format A4
			Nr normy	PN-EN 10327:2005	0,07	1:1	Arkusz
			półfabrykat (nr normy)				Arkuszy

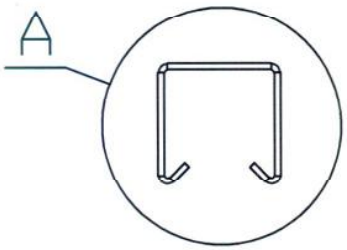
	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	M.Stawikowski		20.10.05	Zacisk śrubowy ZSO
Rysował	M.Stawikowski		20.10.05	
Sprawdził			20.10.05	
Zatwierdził			20.10.05	Nr zmiany

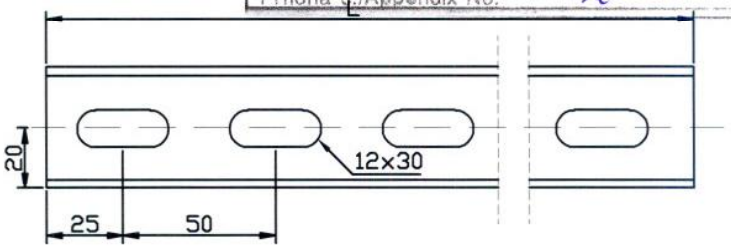
Profesjonalne Systemy Tras Kablowych

Nr rysunku: 806100









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Dokument č. / Document No.: FIRES-FR-198-08-ANNEX

Príloha č./Appendix No. 42

LP	Nazwa wyrobu	Symbol	Nr Katalogowy	L [mm]	Masa [kg]
5	Ceownik wzmocniony	CWOP40H40/ 2	804120	2000	3,50
4	Ceownik wzmocniony	CWOP40H40/05	804105	500	0,88
3	Ceownik wzmocniony	CWOP40H40/04	804104	400	0,70
2	Ceownik wzmocniony	CWOP40H40/03	804103	300	0,53
1	Ceownik wzmocniony	CWOP40H40/02	804102	200	0,35

Dachytka wyniarów nietolerowanych	Grubość (mm) 1,5	Materiał: Gatunek	Blacha stal. cynk. met. Sendzimira	Masa [kg] ---	Podziałka 1:1	Format A4
		Nr normy	PN-EN 10327:2005			Arkusz --
		półfabrykat (nr normy)	-----			Arkuszy --

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

Nazwa rysunku: CWOP40H40/...N

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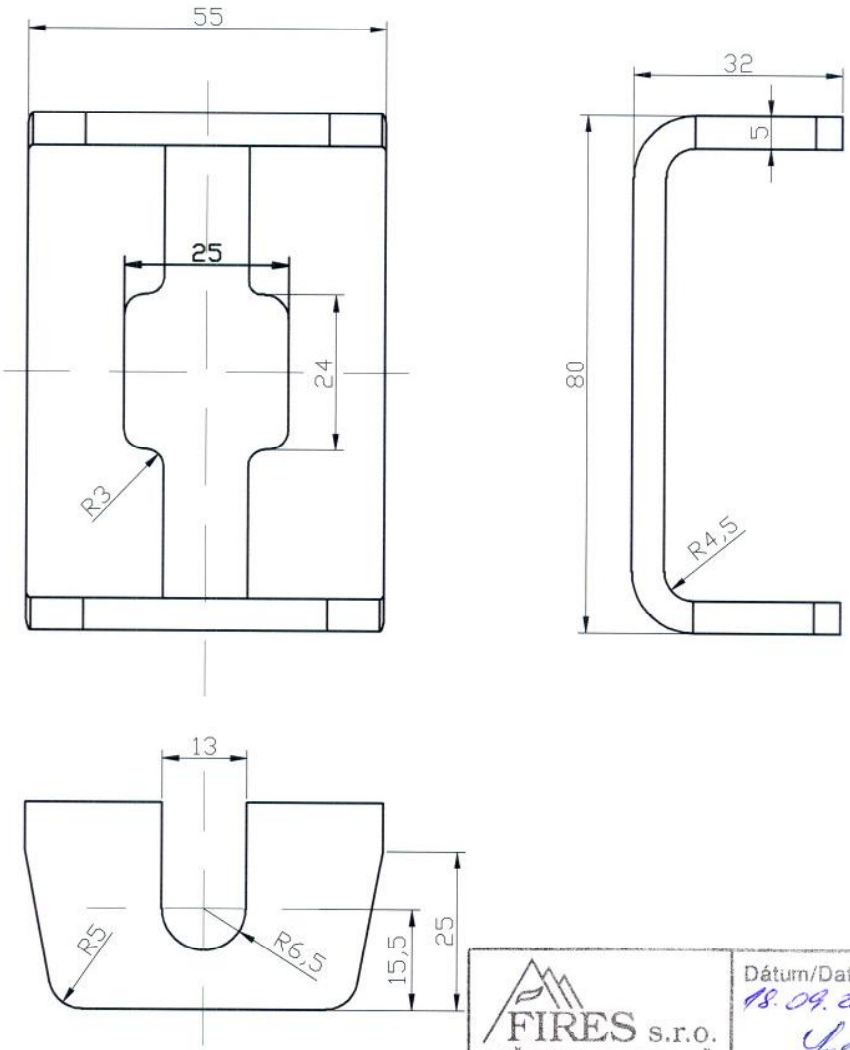
Nr rysunku: 8041.....

Nr zmiany



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Príloha č./Appendix No. 43

	Odchyłka wymiarów nietolerowanych	Grubość [mm] 5	Materiał	Gatunek: Blacha stal. cynk. met. zanurz.	Masa [kg] 0,21	Podziałka 1:1	Format A4	
				Nr normy: PN-EN ISO 1461:2000			Arkusz	
				półfabrykat (nr normy)			Arkuszy	

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

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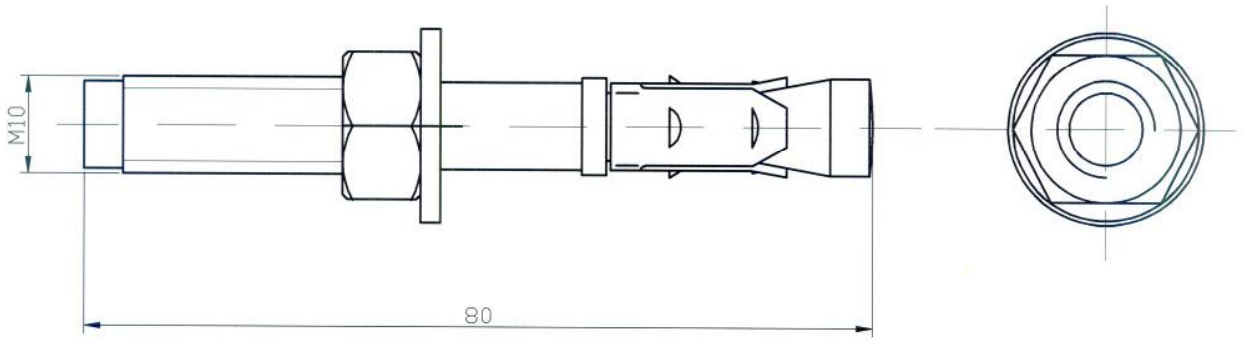
Nr rysunku 803700



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18. 09. 2008
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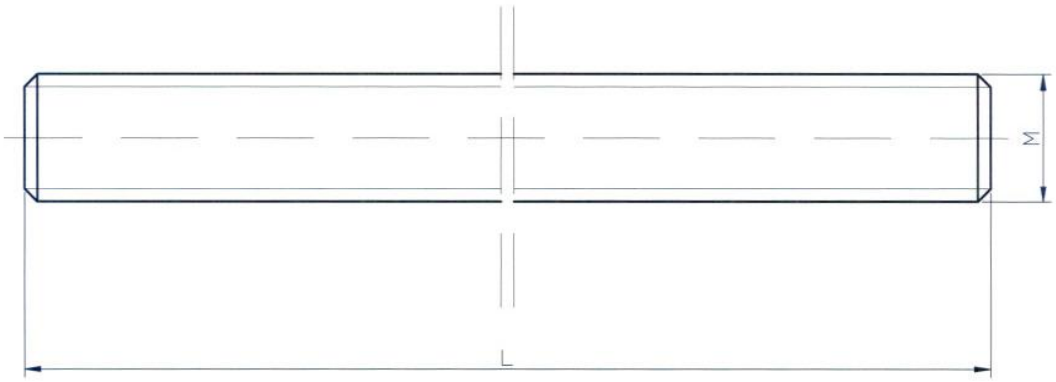
Dokument č./Document No. FIRES-FR-198-08-PAVUC

Príloha č./Appendix No. 44

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



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Príloha č./Appendix No. 45

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

Odchyłka wymiarów nietolerowanych	Grubość [mm] –	Materiał	Gatunek	Stal cynkowana galwanicznie	Masa [kg]	Podziałka 2:1	Format A4	
			Nr normy				Arkusz	
							Arkuszy	

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	J.GRZECHOWSKI		20.10.05	PGM..../1
Rysował	J.Grochowski		20.10.05	
Sprawdził	T.WŁODARCZYK		20.10.05	
Zatwierdził	J.KLICZEK		20.10.05	Nr zmiany

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Nr rysunku

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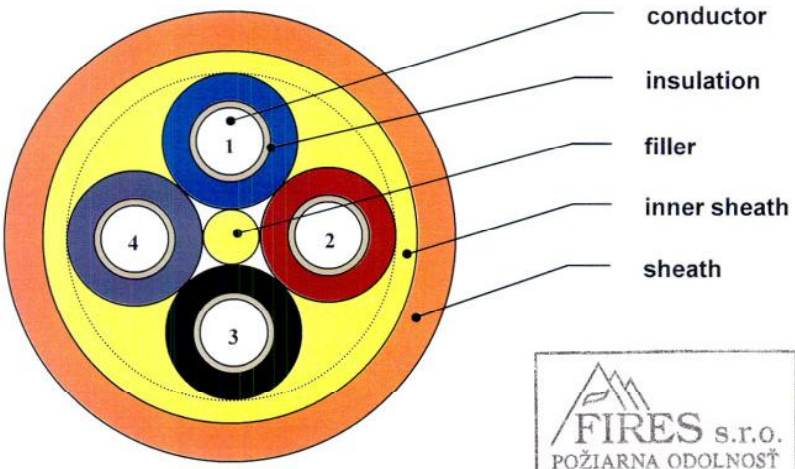
ISO 9001:2000

NHXH FE180 PH30/E30 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



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Dokument č./Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 46

APPLICATIONS

NHXH 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,
sheath	–	orange, cable sheath made of halogen free compound according to HD 604 S1 and VDE 0276-604 –HM4, (oxygen index bigger than 35%).

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www.technokabel.com.pl
export@technokabel.com.pl

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Príloha č./Appendix No. 5A

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NHXH FE180 PH30/E30 0,6/1 kV

CHARACTERISTICS

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

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

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

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

* Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 6,0 RE	8,3	58,0	120
	1 x 10 RE	9,3	96,0	160
	1 x 16 RE	10,3	154,0	240
	1 x 25 RM	12,3	240,0	340
	1 x 35 RM	13,4	336,0	450
	1 x 50 RM	14,1	480,0	570
	1 x 70 RM	15,9	672,0	775
	1 x 95 RM	17,7	912,0	1030
	1 x 120 RM	19,3	1152,0	1260
	2 x 1,5 RE	13,2	28,8	245
	2 x 2,5 RE	14,0	48,0	285
	2 x 4,0 RE	14,9	77,0	345
	2 x 6,0 RE	15,9	115,0	415
	2 x 10 RE	17,6	192,0	550
	2 x 16 RE	19,6	307,0	745
	2 x 25 RM	23,2	480,0	1030
	3 x 1,5 RE	13,7	43,2	270
	3 x 2,5 RE	14,6	72,0	325
	3 x 4,0 RE	15,6	115,0	400
	3 x 6,0 RE	16,7	173,0	490
	3 x 10 RE	18,5	288,0	670

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 RM	20,9	461,0	885
	3 x 25 RM	24,6	720,0	1270
	4 x 1,5 RE	14,7	58,0	315
	4 x 2,5 RE	15,7	96,0	380
	4 x 4,0 RE	16,9	154,0	475
	4 x 6,0 RE	18,1	230,0	585
	4 x 10 RE	20,1	384,0	805
	4 x 16 RM	22,7	614,0	1095
	4 x 25 RM	26,8	960,0	1550
	4 x 35 RM	30,7	1920,0	1550
	4 x 50 RM	31,7	1920,0	2590
	5 x 1,5 RE	15,8	72,0	365
	5 x 2,5 RE	16,9	120,0	445
	5 x 4,0 RE	18,2	192,0	560
	5 x 6,0 RE	19,5	288,0	695
	5 x 10 RE	21,8	480,0	965
	5 x 16 RM	24,8	768,0	1320
	5 x 25 RM	28,5	1200,0	1880
	5 x 35 RM	31,8	1680,0	2480
	5 x 50 RM	35,0	2400,0	3180
	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.

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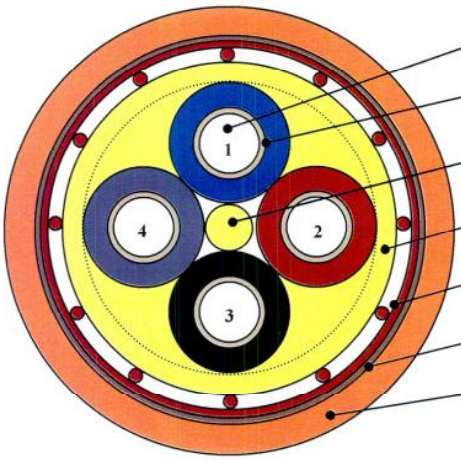
NHXCH FE180 PH30/E30 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



conductor
insulation
filler
inner sheath
concentric conductor
separator
sheath

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FIRE RESISTANCE

Dátum/Date 18. 09. 2008
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Dokument č./Document No. FIRES-FR-138-08-ANJE

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%).

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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 i 4
24 - 40	1; 1.5; 2.5

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

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

* Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	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.

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Príloha č./Appendix No. 49

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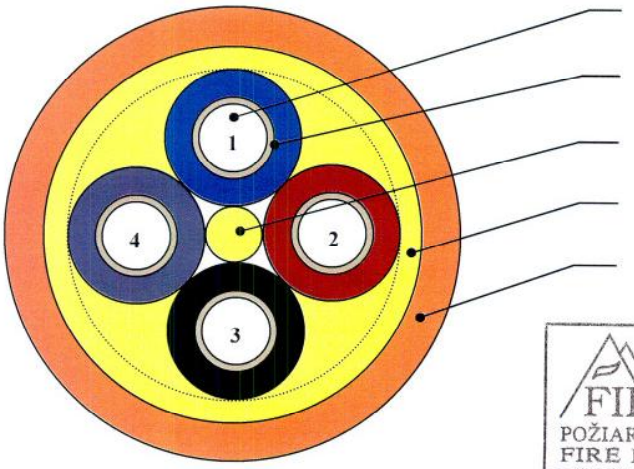
NHXH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 18. 09. 2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ANNE

Príloha č./Appendix No. 50

APPLICATIONS

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

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

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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ISO 9001:2000

NHXH FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

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

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

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

*Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	1 x 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

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

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

Other cross-sections and conductor counts available on request.

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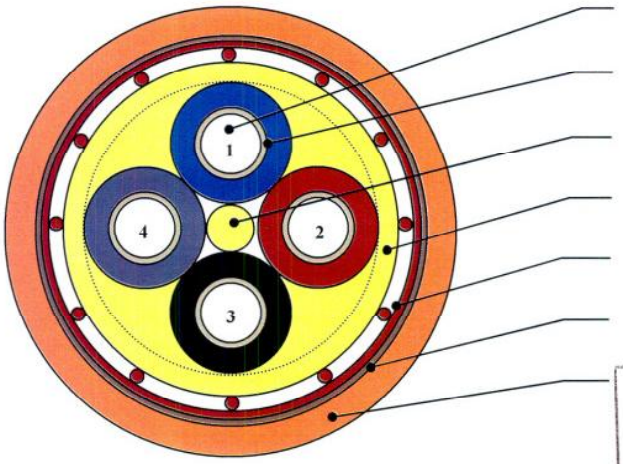
NHXCH FE180 PH90/E90 0,6/1 kV

FIRE RESISTANT HALOGEN FREE POWER CABLES



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FIRE RESISTANCE

Dátum/Date 18.09.2008

Podpis/Signature

Dokument č. / Document No. FIRES-FR-198-08-ANJE

Príloha č./Appendix No. 52

APPLICATIONS

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

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

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

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

The cables are suitable for indoor and outdoor installations.

CONSTRUCTION

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

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NHXCH FE180 PH90/E90 0,6/1 kV

CHARACTERISTICS

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

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

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

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

*Circuit integrity is dependent on installation method.

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

Article No.	Number of conductors x conductor cross-section	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm^2	mm	kg/km	kg/km
	3 x 1,5RE/1,5	16,6	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

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	1498	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

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

Other cross-sections and conductor counts available on request.

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Príloha č./Appendix No. 53

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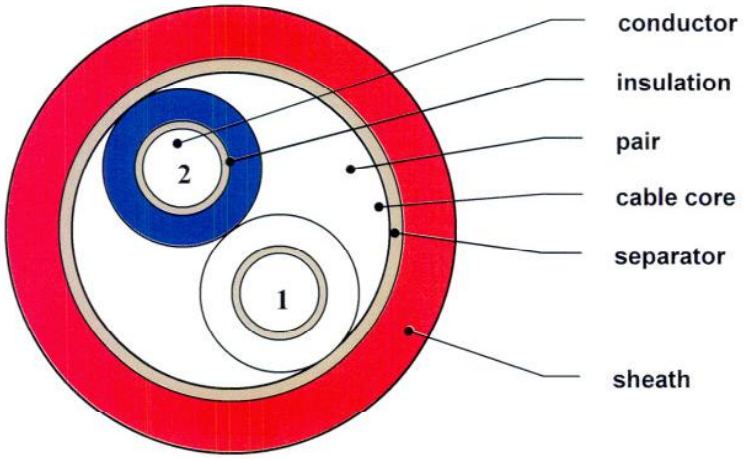
HTKSH FE180 PH90/E30-E90

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.

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Dokument č. / Document No. FIRES-FR-198-08-ANJE

Príloha č./Appendix No. 54

CONSTRUCTION

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

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HTKSH FE180 PH90/E30-E90

CHARACTERISTICS

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

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

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

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

* Circuit integrity is dependent on installation method.

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

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

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Príloha č./Appendix No. 55

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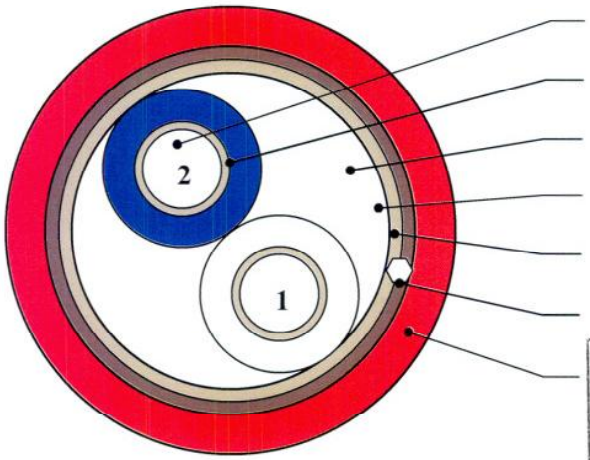
HTKSHekw FE180 PH90/E30-E90

FIRE RESISTANT HALOGEN FREE CABLES



conductor
insulation
pair
cable core
separator
shielding
sheath

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Dokument č./Document No. FIRES-FR-0498-08-AMJE

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%).

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HTKSHekw FE180 PH90/E30-E90

CHARACTERISTICS

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

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

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

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

*Circuit integrity is dependent on installation method.

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

Cable type	Number of pairs (x 2) x conductor diameter	Cable outer diameter (appr.)	Copper index	Cable weight (appr.)
	mm	mm	kg/km	kg/km
HTKSHekw FE180 PH90/E30-E90	1 x 2 x 0.8	7.4	15	66
HTKSHekw FE180 PH90/E30-E90	1 x 2 x 1.0	7.8	20	75

Other diameters and conductor counts available on request.

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Príloha č./Appendix No. 5

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