TEST REPORT FIRES-FR-063-08-AUNE

Cable bearing system BAKS

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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-063-08-AUNE**
Tested property: Function in fire
Test method: DIN 4102 – 12:1998-11

Date of issue: **27. 05. 2008**

Name of the product: Cable bearing system BAKS

Manufacturer: **BAKS Kazimierz Sielski,** ul. Jagodne 5,
05-480 Karczew, Poland - producer of construction

ELKOND HHK a.s., Oravická 1228,
028 01 Trstená, Slovak Republic – producer of cables

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

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Task No.: PR-08-0056
Specimen received: 31. 03. 2008, 15. 04. 2008
Date of the fire test: 17. 04. 2008
Technician responsible for the technical side of this report: Miroslav Hudák

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Number of pages:	8	Number of appendices:	40
Test reports:	3	Copy No.:	2

Distribution list:

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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. Biedrzycki (BAKS)
Mr. Gilian (Elkond)

Test directed by: Mr. Marek Gorlický
Test carried out by: Mr. Miroslav Hudák
Operator: Mr. Alexander Reľovský

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 06 501, F 06 502, F 06 503, F 06 504 F 06 505, F 06 506, F 06 507, F 06 508	Plate thermometers	temperature inside the test furnace, according to EN 1363-1 a DIN 4102-2
F 06 701	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 ELKOND HHK a.s..

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from cable bearing systems BAKS with accessories – trays, ladders, mesh trays, clips UDF, UEF and power and communication non-halogen cables business ELKOND HHK.

Cables:	N2XH 5x1,5 RE FE180/P30	(14 x)
	N2XH 5x10 RE FE180/P30	(14 x)
	N2XH 5x1,5 RE FE180/P60	(12 x)
	N2XH 5x10 RE FE180/P60	(12 x)
	NHXH 5x1,5 RE FE180/P90	(14 x)
	NHXH 5x10 RE FE180/P90	(14 x)
	JE-H(St)H 1x2x0,8 FE180/P30	(14 x)
	JE-H(St)H 1x2x0,8 FE180/P90	(14 x)

Suspension track No. 1: was made of three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80) in spacing of 1500 mm. Ladders (type DGOP 400H60/3, steel sheet thickness 1,5 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed to horizontal supports with screws M8 (type SGN M8x14). Load-bearing system was loaded with 20 kg/m.
Suspension track No. 2: was made of three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80) in spacing of 1500 mm. Trays (type KCOD 400H60/3, steel sheet thickness 1,2 mm) were jointed together by two junctions (type LPOPH60N) and by sheet (type BLO400N) with screws M6 (type SGN M6x12) and fixed to horizontal supports with screws M6 (type SGN M6x12). Load-bearing system was loaded with 10 kg/m.
Suspension track No. 3: was made of four consoles (type WKSO60) which were fixed to ceiling by dowels (type SRO M6x30) in spacing of 1200 mm. Mesh trays (type KDSO60H60/3) were jointed together by two junctions (type USSPWO) and fixed to consoles. Load-bearing system was loaded with 1,5 kg/m.
Suspension track No. 4: was made of four consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80) in spacing of 1200 mm. Mesh trays (type KDSO400H60/3) were jointed together by four junctions (type USSO) and fixed to horizontal supports. Load-bearing system was loaded with 20 kg/m.
Suspension track No. 5: was made of four consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80) in spacing of 1200 mm. Trays (type KCOP 400H60/3, steel sheet thickness 1,5 mm) were jointed together by two junctions (type LPOPH60N) and by sheet (type BLO400N) with screws M6 (type SGN M6x12) and fixed to horizontal supports with screws M6 (type SGN M6x12). Load-bearing system was loaded with 10 kg/m.
Suspension track No. 6: was made of four consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM10/1x600) with washers and nuts M10 and two hangers (type USOV) which were fixed to ceiling by dowels (type PSRO M10x80) in spacing of 1200 mm. Ladders (type DGOP 400H60/3, steel sheet thickness 1,5 mm) were jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14) and fixed to horizontal supports with screws M8 (type SGN M8x14). Load-bearing system was loaded with 20 kg/m.
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
47,7	2,0	22,8	0,5

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]**
17. 04. 2008	33,3	10,9

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
Specimens 1, 2: cables N2XH 5x10 RE FE180/P60	**81 minutes**
Specimen 3: cables N2XH 5x1,5 RE FE180/P60	**90 minutes no failure/interruption**
Specimens 4, 5: cables N2XH 5x10 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 6: cables N2XH 5x1,5 RE FE180/P30	**90 minutes no failure/interruption**
Specimens 7, 8: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 9: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimens 10, 11: cables N2XH 5x10 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 12: cables N2XH 5x1,5 RE FE180/P60	**72 minutes**
Specimen 13: cable N2XH 5x10 RE FE180/P30	**73 minutes**
Specimen 14: cable N2XH 5x10 RE FE180/P30	**81 minutes**
Specimen 15: cables N2XH 5x1,5 RE FE180/P30	**66 minutes**
Specimens 16, 17: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 18: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimens 19, 21: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimens 20, 22: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimens 23, 25: cables N2XH 5x10 RE FE180/P30	**90 minutes no failure/interruption**
Specimens 24, 26: cables N2XH 5x1,5 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 27: cables N2XH 5x10 RE FE180/P60	**63 minutes**
Specimen 28: cables N2XH 5x1,5 RE FE180/P60	**63 minutes**
Specimen 29: cables N2XH 5x10 RE FE180/P30	**87 minutes**
Specimen 30: cables N2XH 5x1,5 RE FE180/P30	**81 minutes**
Specimen 31: cables NHXH 5x10 RE FE180/P90	**88 minutes**
Specimen 32: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 33: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 34: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 35: cables N2XH 5x10 RE FE180/P60	**73 minutes**
Specimen 36: cables N2XH 5x1,5 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 37: cables N2XH 5x10 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 38: cables N2XH 5x1,5 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 39: cables N2XH 5x10 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 40: cables N2XH 5x1,5 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 41: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 42: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 43: cables N2XH 5x10 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 44: cables N2XH 5x1,5 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 45: cables N2XH 5x10 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 46: cables N2XH 5x1,5 RE FE180/P60	**90 minutes no failure/interruption**
Specimen 47: cables N2XH 5x10 RE FE180/P30	**90 minutes no failure/interruption**
Specimen 48: cables N2XH 5x1,5 RE FE180/P30	**90 minutes no failure/interruption**
Specimens 49, 50: cables NHXH 5x10 RE FE180/P90	**90 minutes no failure/interruption**
Specimen 51: cables NHXH 5x1,5 RE FE180/P90	**90 minutes no failure/interruption**

SPECIMENS	Time to first failure/interruption of conductor
Specimen 52A, B: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 53A: cable JE-H(St)H 1x2x0,8 FE180/P30	**61 minutes**
Specimen 53B: cable JE-H(St)H 1x2x0,8 FE180/P30	**58 minutes**
Specimen 54A: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 54B: cable JE-H(St)H 1x2x0,8 FE180/P90	**80 minutes**
Specimen 55A: cable JE-H(St)H 1x2x0,8 FE180/P30	**6 minutes**
Specimen 55B: cable JE-H(St)H 1x2x0,8 FE180/P30	**65 minutes**
Specimen 56 A, B: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 57A: cable JE-H(St)H 1x2x0,8 FE180/P30	**90 minutes no failure/interruption**
Specimen 57B: cable JE-H(St)H 1x2x0,8 FE180/P30	**76 minutes**
Specimen 58A: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 58B: cable JE-H(St)H 1x2x0,8 FE180/P90	**58 minutes**
Specimen 59A: cable JE-H(St)H 1x2x0,8 FE180/P30	**70 minutes**
Specimen 59B: cable JE-H(St)H 1x2x0,8 FE180/P30	**50 minutes**
Specimen 60 A, B: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 61A: cable JE-H(St)H 1x2x0,8 FE180/P30	**74 minutes**
Specimen 61B: cable JE-H(St)H 1x2x0,8 FE180/P30	**90 minutes no failure/interruption**
Specimen 62 A, B: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 63A: cable JE-H(St)H 1x2x0,8 FE180/P30	**59 minutes**
Specimen 63B: cable JE-H(St)H 1x2x0,8 FE180/P30	**90 minutes no failure/interruption**
Specimen 64 A, B: cable JE-H(St)H 1x2x0,8 FE180/P90	**90 minutes no failure/interruption**
Specimen 65A: cable JE-H(St)H 1x2x0,8 FE180/P30	**75 minutes**
Specimen 65B: cable JE-H(St)H 1x2x0,8 FE180/P30	**80 minutes**

The fire test was discontinued in 93rd minute at the request of sponsor.

Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S65 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

6. CLOSING

- This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in EN 1363-1 and DIN 4102 – 12:1998-11. Any significant deviation with respect to size, constructional details, loads, stresses, edges or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.
- Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.
- The test results refer only to the tested subjects. This test report is not an approval of the tested product by the test laboratory or the accreditation body overseeing the laboratory's activities. The test was carried out on testing equipment that is the property of FIRES Ltd. Without the written permission of the test laboratory this test report may be copied and/or distributed only as the whole. Any modifications of the test report can be made only by the fire resistance test laboratory FIRES Ltd. Batizovce.

Report checked by: Ing. Štefan Rástocký
Translated by: Ing. Marek Rusnák

Issued by: **Responsible for the technical side of this report:**

Ing. Štefan Rástocký
leader of the testing laboratory

Miroslav Hudák
technician of the testing laboratory

7. NORMATIVE REFERENCES

DIN 4102 – 2:1977-09	Fire behaviour of building materials and elements - requirements and testing
DIN 4102 – 12:1998-11	Fire resistance of electric cable systems required to maintain circuit integrity
STN EN 1363-1:2001	Fire resistance tests – Part 1: General requirements

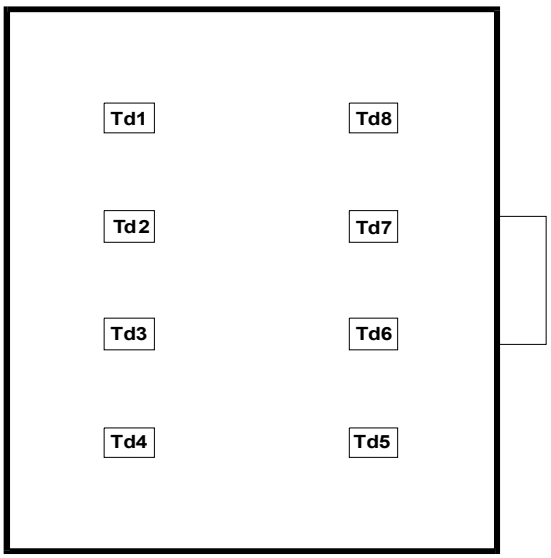
8. LIST OF APPENDICES

Measured values inside the test furnace

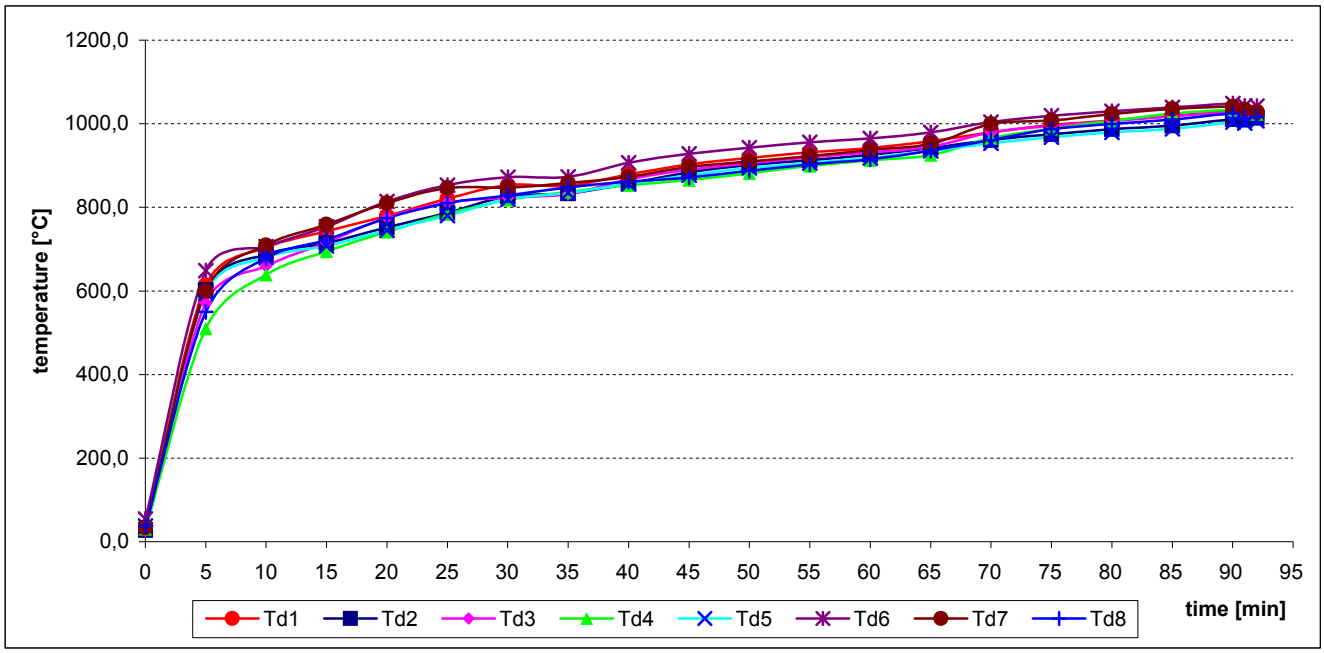
Time t [min]	Temperature [°C]											Deviation d_e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	34,3	27,3	26,9	30,7	37,7	54,1	33,9	37,6	35,3	20,0	10,9	0,0	7,0
5	613,2	601,8	571,4	510,4	594,8	648,4	599,9	549,5	586,2	576,4	11,2	-6,0	12,1
10	702,7	687,0	659,3	638,8	680,0	705,8	709,1	678,5	682,7	678,3	11,2	-1,7	11,6
15	742,9	714,8	715,7	694,2	707,8	753,5	759,1	721,9	726,2	738,5	11,8	-5,0	13,7
20	779,8	752,0	775,6	741,3	745,0	814,4	810,2	774,0	774,0	781,3	11,8	-4,0	12,3
25	821,0	787,2	811,8	784,6	780,2	853,0	846,4	810,3	811,8	814,6	11,6	-3,1	14,8
30	853,0	826,5	823,0	817,5	819,5	872,6	846,6	828,8	835,9	841,8	11,5	-2,6	14,8
35	851,8	832,9	831,6	837,3	834,9	872,9	858,2	847,4	845,9	864,8	11,5	-2,5	15,4
40	878,8	857,0	867,1	852,8	856,0	906,5	873,1	861,9	869,2	884,7	11,2	-2,4	16,0
45	902,8	883,9	890,0	865,1	876,9	928,3	896,4	871,2	889,3	902,3	11,1	-2,3	15,6
50	918,3	901,5	904,9	881,7	894,5	942,5	909,5	887,5	905,1	918,1	11,0	-2,2	16,0
55	932,2	913,0	919,7	898,7	906,0	955,8	922,8	902,8	918,9	932,3	11,0	-2,1	13,0
60	942,2	925,5	931,5	912,6	918,5	965,2	937,4	915,3	931,0	945,3	11,0	-2,1	12,0
65	958,0	942,3	944,8	924,9	935,3	979,8	951,6	936,1	946,6	957,3	10,8	-2,0	12,4
70	979,1	960,7	979,4	966,0	953,7	1004,0	999,7	961,3	975,5	968,4	10,7	-1,8	14,1
75	996,8	975,2	994,9	987,7	968,2	1019,0	1008,0	987,2	992,1	978,7	11,9	-1,6	13,6
80	1008,0	986,8	1006,0	1007,1	979,8	1030,0	1023,0	999,2	1005,0	988,4	12,9	-1,4	13,0
85	1019,0	995,2	1018,0	1025,0	988,2	1039,0	1035,0	1010,0	1016,2	997,4	13,5	-1,1	12,1
90	1030,0	1011,0	1027,0	1033,0	1004,0	1048,0	1041,0	1025,0	1027,4	1005,9	13,7	-0,9	13,6
91	1025,0	1009,0	1021,0	1028,0	1002,0	1043,0	1034,0	1014,0	1022,0	1007,6	13,6	-0,9	14,4
92	1029,0	1014,0	1017,0	1023,0	1007,0	1042,0	1028,0	1017,0	1022,1	1009,2	13,6	-0,9	12,8

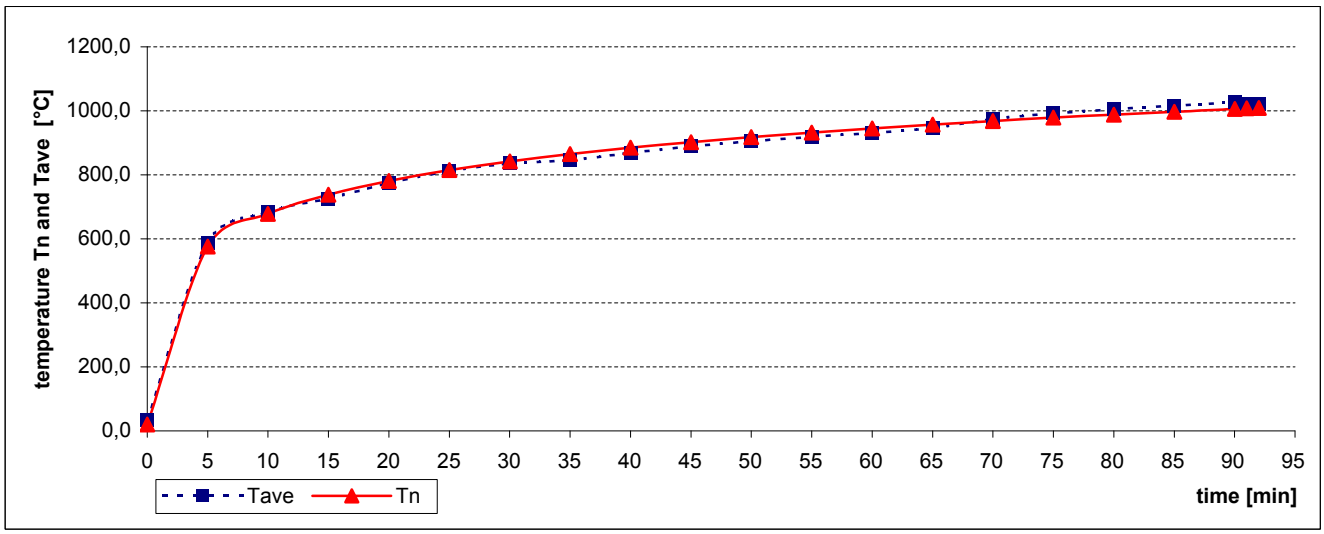
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

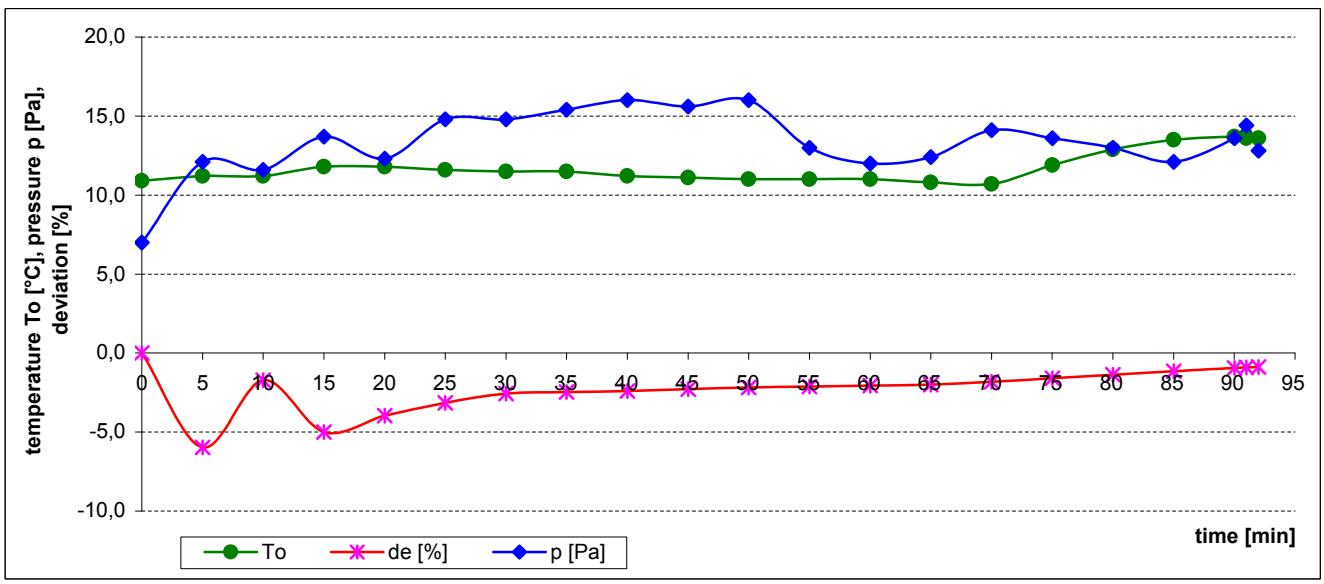
Layout of measuring points in the test furnace:



Measured values inside the test furnace / graph







Measured time of tested specimens from S 1 to S 9

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 1	1-L1	x
	2-L2	81:03
	3-L3	81.03
	4-PEN	x
S 2	5-L1	x
	6-L2	x
	7-L3	81:23
	8-PEN	x
S 3	9-L1	no failure / interruption
	10-L2	no failure / interruption
	11-L3	no failure / interruption
	12-PEN	no failure / interruption
S 4	13-L1	no failure / interruption
	14-L2	no failure / interruption
	15-L3	no failure / interruption
	16-PEN	no failure / interruption
S 5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S 6	21-L1	no failure / interruption
	22-L2	no failure / interruption
	23-L3	no failure / interruption
	24-PEN	no failure / interruption
S 7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S 8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S 9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption

Specimens 1, 2: cables N2XH 5x10 RE FE180/P60
Specimen 3: cables N2XH 5x1,5 RE FE180/P60
Specimens 4, 5: cables N2XH 5x10 RE FE180/P30
Specimen 6: cables N2XH 5x1,5 RE FE180/P30
Specimens 7, 8: cables NHXH 5x10 RE FE180/P90
Specimen 9: cable NHXH 5x1,5 RE FE180/P90

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 S 10 to S 18

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 10	37-L1	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption
S 11	41-L1	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S 12	45-L1	x
	46-L2	72:23
	47-L3	72:23
	48-PEN	x
S 13	49-L1	x
	50-L2	73:38
	51-L3	73:38
	52-PEN	73:38
S 14	53-L1	81:24
	54-L2	81:24
	55-L3	81:24
	56-PEN	81:24
S 15	57-L1	66:28
	58-L2	66:28
	59-L3	66:28
	60-PEN	66:28
S 16	61-L1	no failure / interruption
	62-L2	no failure / interruption
	63-L3	no failure / interruption
	64-PEN	no failure / interruption
S 17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
S 18	69-L1	no failure / interruption
	70-L2	no failure / interruption
	71-L3	no failure / interruption
	72-PEN	no failure / interruption

Specimens 10, 11: cables N2XH 5x10 RE FE180/P60
Specimen 12: cables N2XH 5x1,5 RE FE180/P60
Specimens 13, 14: cables N2XH 5x10 RE FE180/P30
Specimen 15: cables N2XH 5x1,5 RE FE180/P30
Specimens 16, 17: cables NHXH 5x10 RE FE180/P90
Specimen 18: cables NHXH 5x1,5 RE FE180/P90

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 S 19 to S 26

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 19	73-L1	no failure / interruption
	74-L2	no failure / interruption
	75-L3	no failure / interruption
	76-PEN	no failure / interruption
S 20	77-L1	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption
S 21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S 22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
S 23	89-L1	no failure / interruption
	90-L2	no failure / interruption
	91-L3	no failure / interruption
	92-PEN	no failure / interruption
S 24	93-L1	no failure / interruption
	94-L2	no failure / interruption
	95-L3	no failure / interruption
	96-PEN	no failure / interruption
S 25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S 26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption

Specimens 19, 21: cables NHXH 5x10 RE FE180/P90
Specimens 20, 22: cables NHXH 5x1,5 RE FE180/P90
Specimens 23, 25: cables N2XH 5x10 RE FE180/P30
Specimens 24, 26: cables N2XH 5x1,5 RE FE180/P30

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 S 27 to S 34

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 27	105-L1	63:53
	106-L2	x
	107-L3	x
	108-PEN	x
S 28	109-L1	x
	110-L2	63:32
	111-L3	x
	112-PEN	x
S 29	113-L1	87:15
	114-L2	87:15
	115-L3	87:15
	116-PEN	87:15
S 30	117-L1	81:15
	118-L2	81:15
	119-L3	81:15
	120-PEN	81:15
S 31	121-L1	x
	122-L2	88:37
	123-L3	x
	124-PEN	x
S 32	125-L1	no failure / interruption
	126-L2	no failure / interruption
	127-L3	no failure / interruption
	128-PEN	no failure / interruption
S 33	129-L1	no failure / interruption
	130-L2	no failure / interruption
	131-L3	no failure / interruption
	132-PEN	no failure / interruption
S 34	133-L1	no failure / interruption
	134-L2	no failure / interruption
	135-L3	no failure / interruption
	136-PEN	no failure / interruption

Specimen 27: cables N2XH 5x10 RE FE180/P60
Specimen 28: cables N2XH 5x1,5 RE FE180/P60
Specimen 29: cables N2XH 5x10 RE FE180/P30
Specimen 30: cables N2XH 5x1,5 RE FE180/P30
Specimens 31, 33: cables NHXH 5x10 RE FE180/P90
Specimens 32, 34: cables NHXH 5x1,5 RE FE180/P90

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 S 35 to S 42

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 35	137-L1	73:14
	138-L2	73:14
	139-L3	x
	140-PEN	x
S 36	141-L1	no failure / interruption
	142-L2	no failure / interruption
	143-L3	no failure / interruption
	144-PEN	no failure / interruption
S 37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S 38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S 39	153-L1	no failure / interruption
	154-L2	no failure / interruption
	155-L3	no failure / interruption
	156-PEN	no failure / interruption
S 40	157-L1	no failure / interruption
	158-L2	no failure / interruption
	159-L3	no failure / interruption
	160-PEN	no failure / interruption
S 41	161-L1	no failure / interruption
	162-L2	no failure / interruption
	163-L3	no failure / interruption
	164-PEN	no failure / interruption
S 42	165-L1	no failure / interruption
	166-L2	no failure / interruption
	167-L3	no failure / interruption
	168-PEN	no failure / interruption

Specimens 35, 37: cables N2XH 5x10 RE FE180/P60
Specimens 36, 38: cables N2XH 5x1,5 RE FE180/P60
Specimen 39: cables N2XH 5x10 RE FE180/P30
Specimen 40: cables N2XH 5x1,5 RE FE180/P30
Specimen 41: cables NHXH 5x10 RE FE180/P90
Specimen 42: cables NHXH 5x1,5 RE FE180/P90

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 S 43 to S 51

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 43	169-L1	no failure / interruption
	170-L2	no failure / interruption
	171-L3	no failure / interruption
	172-PEN	no failure / interruption
S 44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption
S 45	177-L1	no failure / interruption
	178-L2	no failure / interruption
	179-L3	no failure / interruption
	180-PEN	no failure / interruption
S 46	181-L1	no failure / interruption
	182-L2	no failure / interruption
	183-L3	no failure / interruption
	184-PEN	no failure / interruption
S 47	185-L1	no failure / interruption
	186-L2	no failure / interruption
	187-L3	no failure / interruption
	188-PEN	no failure / interruption
S 48	189-L1	no failure / interruption
	190-L2	no failure / interruption
	191-L3	no failure / interruption
	192-PEN	no failure / interruption
S 49	193-L1	no failure / interruption
	194-L2	no failure / interruption
	195-L3	no failure / interruption
	196-PEN	no failure / interruption
S 50	197-L1	no failure / interruption
	198-L2	no failure / interruption
	199-L3	no failure / interruption
	200-PEN	no failure / interruption
S 51	201-L1	no failure / interruption
	202-L2	no failure / interruption
	203-L3	no failure / interruption
	204-PEN	no failure / interruption

Specimens 43, 47: cables N2XH 5x10 RE FE180/P30
Specimens 44, 48: cables N2XH 5x1,5 RE FE180/P30
Specimen 45: cables N2XH 5x10 RE FE180/P60
Specimen 46: cables N2XH 5x1,5 RE FE180/P60
Specimens 49, 50: cables NHXH 5x10 RE FE180/P90
Specimen 51: cables NHXH 5x1,5 RE FE180/P90

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 S 52 to S 59

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 52A	209-L	no failure / interruption
	210-PEN	no failure / interruption
S 52B	211-L	no failure / interruption
	212-PEN	no failure / interruption
S 53A	213-L	61:41
	214-PEN	x
S 53B	215-L	58:28
	216-PEN	x
S 54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S 54B	219-L	80:58
	220-PEN	x
S 55A	221-L	6:27
	222-PEN	x
S 55B	223-L	65:49
	224-PEN	x
S 56A	225-L	no failure / interruption
	226-PEN	no failure / interruption
S 56B	227-L	no failure / interruption
	228-PEN	no failure / interruption
S 57A	229-L	no failure / interruption
	230-PEN	no failure / interruption
S 57B	231-L	76:44
	232-PEN	x
S 58A	233-L	no failure / interruption
	234-PEN	no failure / interruption
S 58B	235-L	58:58
	236-PEN	x
S 59A	237-L	70:11
	238-PEN	x
S 59B	239-L	50:04
	240-PEN	x

Specimens 52, 54: cables JE-H(St)H 1x2x0,8 FE180/P90
Specimens 53, 55: cables JE-H(St)H 1x2x0,8 FE180/P30
Specimens 56, 58: cables JE-H(St)H 1x2x0,8 FE180/P90
Specimens 57, 59: cables JE-H(St)H 1x2x0,8 FE180/P30

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

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

Measured time of tested specimens from S 60 to S 65

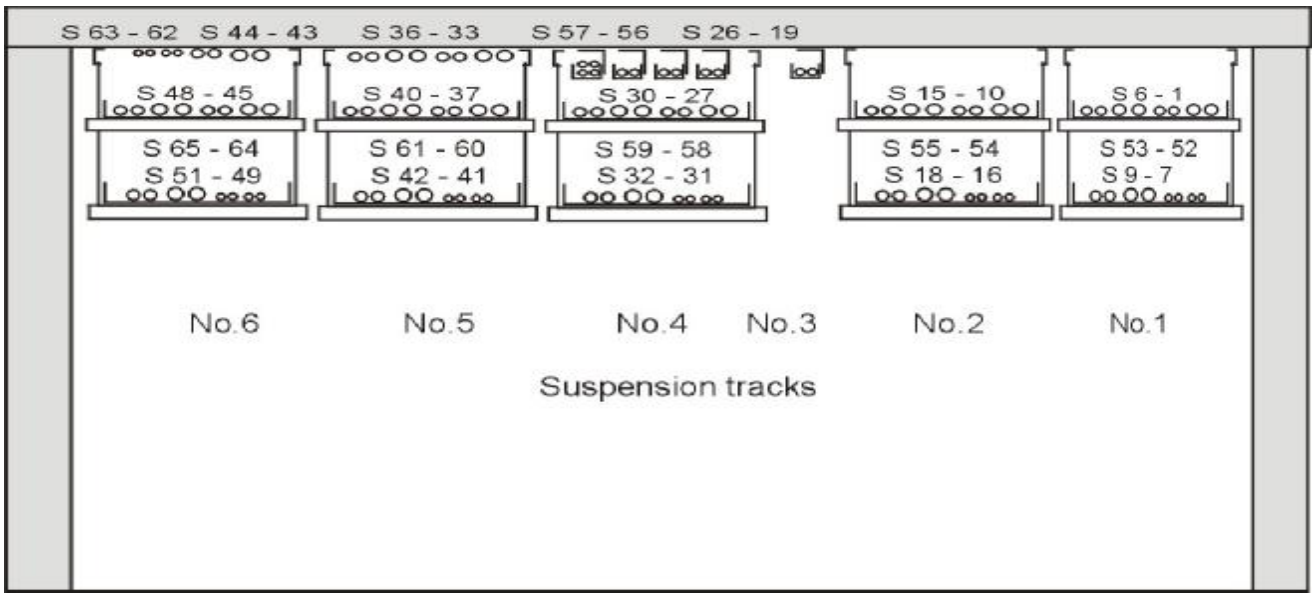
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S 60A	241-L	no failure / interruption
	242-PEN	no failure / interruption
S 60B	243-L	no failure / interruption
	244-PEN	no failure / interruption
S 61A	245-L	no failure / interruption
	246-PEN	no failure / interruption
S 61B	247-L	74:13
	248-PEN	x
S 62A	249-L	no failure / interruption
	250-PEN	no failure / interruption
S 62B	251-L	no failure / interruption
	252-PEN	no failure / interruption
S 63A	253-L	59:29
	254-PEN	x
S 63B	255-L	no failure / interruption
	256-PEN	no failure / interruption
S 64A	257-L	no failure / interruption
	258-PEN	no failure / interruption
S 64B	259-L	no failure / interruption
	260-PEN	no failure / interruption
S 65A	261-L	75:05
	262-PEN	x
S 65B	263-L	80:10
	264-PEN	x

Specimen 60: cables JE-H(St)H 1x2x0,8 FE180/P90
Specimen 61: cables JE-H(St)H 1x2x0,8 FE180/P30
Specimen 62: cables JE-H(St)H 1x2x0,8 FE180/P90
Specimen 63: cables JE-H(St)H 1x2x0,8 FE180/P30
Specimen 64: cables JE-H(St)H 1x2x0,8 FE180/P90
Specimen 65: cables JE-H(St)H 1x2x0,8 FE180/P30

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

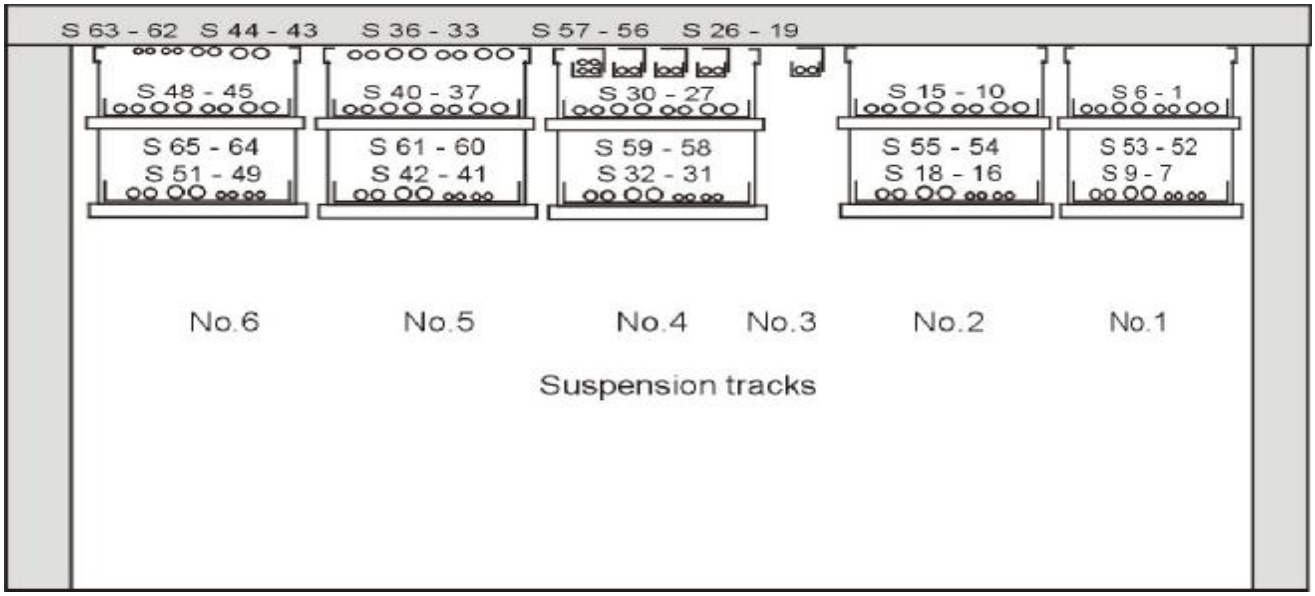
Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,03W. Circuit breakers with rating 3 A were used.

Layout of cables in the test furnace



Specimens 1, 2: cables N2XH 5x10 RE FE180/P60	Specimens placed on the ladders DGOP400H60/3 (BAKS). Suspension track No.1
Specimen 3: cables N2XH 5x1,5 RE FE180/P60	
Specimens 4, 5: cables N2XH 5x10 RE FE180/P30	
Specimen 6: cables N2XH 5x1,5 RE FE180/P30	
Specimens 7, 8: cables NHXH 5x10 RE FE180/P90	
Specimen 9: cable NHXH 5x1,5 RE FE180/P90	
Specimens 10, 11: cables N2XH 5x10 RE FE180/P60	Specimens placed in the cable trays KCOD400H60/3 (BAKS). Suspension track No.2
Specimen 12: cables N2XH 5x1,5 RE FE180/P60	
Specimens 13, 14: cables N2XH 5x10 RE FE180/P30	
Specimen 15: cables N2XH 5x1,5 RE FE180/P30	
Specimens 16, 17: cables NHXH 5x10 RE FE180/P90	
Specimen 18: cables NHXH 5x1,5 RE FE180/P90	
Specimens 19, 21: cables NHXH 5x10 RE FE180/P90	Specimens placed in the mesh trays KDSO60H60/3 (BAKS). Suspension track No.3
Specimens 20, 22: cables NHXH 5x1,5 RE FE180/P90	
Specimens 23, 25: cables N2XH 5x10 RE FE180/P30	
Specimens 24, 26: cables N2XH 5x1,5 RE FE180/P30	
Specimen 27: cables N2XH 5x10 RE FE180/P60	Specimens placed in the mesh trays KDSO400H60/3 (BAKS). Suspension track No.4
Specimen 28: cables N2XH 5x1,5 RE FE180/P60	
Specimen 29: cables N2XH 5x10 RE FE180/P30	
Specimen 30: cables N2XH 5x1,5 RE FE180/P30	
Specimen 31: cables NHXH 5x10 RE FE180/P90	
Specimen 32: cables NHXH 5x1,5 RE FE180/P90	
Specimen 33: cables NHXH 5x10 RE FE180/P90	Specimens placed in ceiling clips UEF (BAKS) in spacing of 600 mm
Specimen 34: cables NHXH 5x1,5 RE FE180/P90	
Specimen 35: cables N2XH 5x10 RE FE180/P60	
Specimen 36: cables N2XH 5x1,5 RE FE180/P60	
Specimen 37: cables N2XH 5x10 RE FE180/P60	Specimens placed in the cable trays KCOD400H60/3 (BAKS). Suspension track No.5
Specimen 38: cables N2XH 5x1,5 RE FE180/P60	
Specimen 39: cables N2XH 5x10 RE FE180/P30	
Specimen 40: cables N2XH 5x1,5 RE FE180/P30	
Specimen 41: cables NHXH 5x10 RE FE180/P90	
Specimen 42: cables NHXH 5x1,5 RE FE180/P90	
Specimen 43: cables N2XH 5x10 RE FE180/P30	Specimens placed in ceiling clips UDF (BAKS) in spacing of 600 mm
Specimen 44: cables N2XH 5x1,5 RE FE180/P30	
Specimen 45: cables N2XH 5x10 RE FE180/P60	Specimens placed on the ladders DGOP400H60/3 (BAKS). Suspension track No.6
Specimen 46: cables N2XH 5x1,5 RE FE180/P60	
Specimen 47: cables N2XH 5x10 RE FE180/P30	
Specimen 48: cables N2XH 5x1,5 RE FE180/P30	
Specimens 49, 50: cables NHXH 5x10 RE FE180/P90	
Specimen 51: cables NHXH 5x1,5 RE FE180/P90	

Layout of cables in the test furnace



Specimen 52: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed on the ladders DGOP400H60/3 (BAKS). Suspension track No.1
Specimen 53: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 54: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed in the cable trays KCOD400H60/3 (BAKS). Suspension track No.2
Specimen 55: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 56: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed in the mesh trays KDSO60H60/3 (BAKS). Suspension track No.3
Specimen 57: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 58: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed in the mesh trays KDSO400H60/3 (BAKS). Suspension track No.4
Specimen 59: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 60: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed in the cable trays KCOD400H60/3 (BAKS). Suspension track No.5
Specimen 61: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 62: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed in ceiling clips UDF (BAKS) in spacing of 600 mm
Specimen 63: cables JE-H(St)H 1x2x0,8 FE180/P30	
Specimen 64: cables JE-H(St)H 1x2x0,8 FE180/P90	Specimens placed on the ladders DGOP400H60/3 (BAKS). Suspension track No.6
Specimen 65: cables JE-H(St)H 1x2x0,8 FE180/P30	

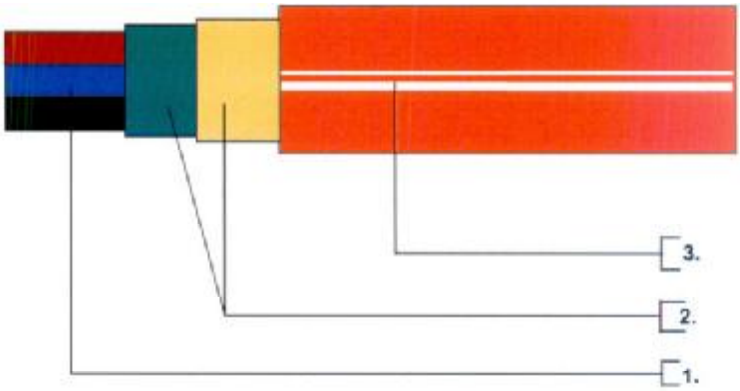
Photos taken before the test

Photos taken after the termination of the test

N2XH ... FE180/P30

Silové káble s medenými jadrami, s funkčnosťou **180 minút** počas a po ukončení pôsobenia ohňa podľa **STN IEC 60331-21**, so zvýšenou odolnosťou voči šíreniu plameňa podľa **STN EN 50266-2-4 (Kat. C)**, bezhalogénové s nízkou hustotou dymu vytvoreným pri horení podľa **STN EN 61034-1, -2**, a nízkou korozivitou splodín podľa **STN EN 50267-2-2, -3**, s funkčnou odolnosťou pre elektrický systém v požiari P30 podľa **STN 92 0205**, pre menovité napätie sústavy do 0,6/1,0 kV vrátane.

Technický predpis: **TPEFK 02-12-2006/782, STN 34 7660/A3 (HD 604 S1:1994/A3:2005), DIN VDE 0266**



Konštrukcia kábla:

1. Kruhový medený vodič s izoláciou, ktorá pozostáva zo sklosľudovej izolačnej pásky, na ktorú je nanesená vrstva zosieteného polyetylénu, žily sú polohovo spletané do jadra kábla.
2. Nad jadrom kábla je v súvislej vrstve vytlačovaný bezhalogénový, oheň nešíriaci výplňový obal.
3. Plášť kábla je z bezhalogénovej, oheň nešíriacej termoplastickej zmesi typu MHN 2 (HM 4)

Povolené teploty:

- pri montáži **-5° až +50°C**
- pri prevádzke **-30°C až +90°C**
- Cu jadro pri prevádzke **+90°C**

Použitie:

Káble sú určené na rozvod elektrickej energie. Môžu byť použité v prostredí s nebezpečenstvom požiaru a inštalované na horľavý povrch. Káble sú určené na pevné uloženie. Je vhodné ich použiť všade tam, kde je v prípade požiaru potrebné chrániť ľudské životy alebo majetok, napr. v priemyselných komplexoch, verejných budovách, hoteloch, na letiskách, v nemocniciach.

Menovité napätie:

- 0,6/1 kV

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 11.07.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-ANNEX
Príloha č./Appendix No. 5

Technické údaje :

Farebné značenie podľa STN EN 34 7411 (HD 308 S2:2001)

	Bez ochranného vodiča				S ochranným vodičom		
Počet žil	2-O	3-O	4-O	5-O	3-J	4-J	5-J
1	●	●	●	●	●	●	●
2	●	●	●	●	●	●	●
3		●	●	●	●	●	●
4			●	●		●	●
5				●			●

Informatívne priemery, hmotnosti káblov, spaľovacie teplo.

Konštrukcia kábla	D [mm]	M [kg/km]	Q [kWh/kg]
2 x 1,5 RE	11,7	180	0,56
3 x 1,5 RE	12,2	200	0,61
4 x 1,5 RE	13,1	235	0,71
5 x 1,5 RE	14,1	280	0,84
2 x 2,5 RE	12,4	217	0,62
3 x 2,5 RE	12,9	242	0,67
4 x 2,5 RE	14,1	299	0,81
5 x 2,5 RE	15,1	355	0,95
2 x 4,0 RE	13,5	278	0,72
3 x 4,0 RE	14,0	313	0,76
4 x 4,0 RE	15,3	385	0,94
5 x 4,0 RE	16,5	466	1,11
2 x 6,0 RE	14,5	344	0,82
3 x 6,0 RE	15,3	396	0,89
4 x 6,0 RE	16,6	492	1,07
5 x 6,0 RE	18,0	598	1,27
3 x 10,0 RE	17,6	576	1,12
4 x 10,0 RE	18,9	710	1,32
5 x 10,0 RE	20,5	860	1,57

* D informatívny priemer kábla
* M informatívna hmotnosť kábla
* Q spaľovacie teplo (caloric load)

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 19.05.2008
Podpis/Signature

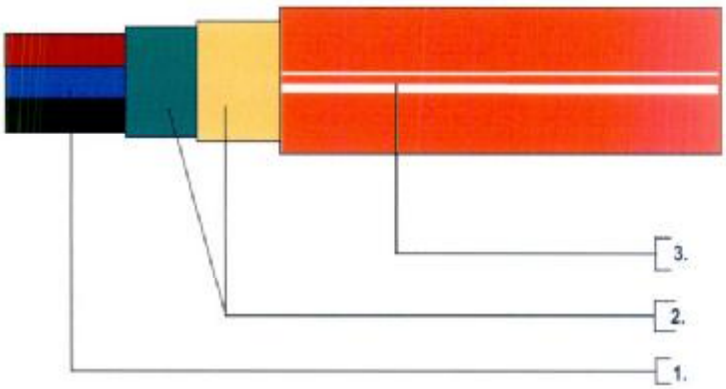
Dokument č./Document No. FIRES-FR-063-08-ANG

Príloha č./Appendix No. 16

N2XH ... FE180/P60

Silové káble s medenými jadrami, s funkčnosťou **180 minút** počas a po ukončení pôsobenia ohňa podľa **STN IEC 60331-21**, so zvýšenou odolnosťou voči šíreniu plameňa podľa **STN EN 50266-2-4** (Kat. C), bezhalogénové s nízkou hustotou dymu vytvorenom pri horení podľa **STN EN 61034-1, -2**, a nízkou korozivitou splodín podľa **STN EN 50267-2-2, -3**, s funkčnou odolnosťou pre elektrický systém v požiari **P60** podľa **STN 92 0205**, pre menovité napätie sústavy do 0,6/1,0 kV vrátane.

Technický predpis: **TPEFK 02-12-2006/782, STN 34 7660/A3 (HD 604 S1:1994/A3:2005), DIN VDE 0266**



Konštrukcia kábla:

1. Kruhový medený vodič s izoláciou, ktorá pozostáva zo sklosťudovej izolačnej pásky, na ktorú je nanesená vrstva zosieteného polyetylénu, žily sú polohovo spletané do jadra kábla.
2. Nad jadrom kábla je v súvislej vrstve vytlačovaný bezhalogénový, oheň nešíriaci výplňový obal.
3. Plášť kábla je z bezhalogénovej, oheň nešíriacej termoplastickej zmesi typu MHN 2 (HM 4)

Povolené teploty:

- pri montáži **-5° až +50°C**
- pri prevádzke **-30°C až +90°C**
- Cu jadro pri prevádzke **+90°C**

Použitie:

Káble sú určené na rozvod elektrickej energie. Môžu byť použité v prostredí s nebezpečenstvom požiaru a inštalované na horľavý povrch. Káble sú určené na pevné uloženie. Je vhodné ich použiť všade tam, kde je v prípade požiaru potrebné chrániť ľudské životy alebo majetok, napr. v priemyselných komplexoch, verejných budovách, hoteloch, na letiskách, v nemocniciach.

Menovité napätie:

- 0,6/1 kV

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 18.04.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-ROVE

Príloha č./Appendix No. 11

Technické údaje :

Farebné značenie podľa STN EN 34 7411 (HD 308 S2:2001)

	Bez ochranného vodiča				S ochranným vodičom		
Počet žil	2-O	3-O	4-O	5-O	3-J	4-J	5-J
1	●	●	●	●	●	●	●
2	●	●	●	●	●	●	●
3		●	●	●	●	●	●
4			●	●		●	●
5				●			●

Informatívne priemery, hmotnosti káblov, spaľovacie teplo.

Konštrukcia kábla	D [mm]	M [kg/km]	Q [kWh/kg]
2 x 1,5 RE	11,7	180	0,56
3 x 1,5 RE	12,2	200	0,61
4 x 1,5 RE	13,1	235	0,71
5 x 1,5 RE	14,1	280	0,84
2 x 2,5 RE	12,4	217	0,62
3 x 2,5 RE	12,9	242	0,67
4 x 2,5 RE	14,1	299	0,81
5 x 2,5 RE	15,1	355	0,95
2 x 4,0 RE	13,5	278	0,72
3 x 4,0 RE	14,0	313	0,76
4 x 4,0 RE	15,3	385	0,94
5 x 4,0 RE	16,5	466	1,11
2 x 6,0 RE	14,5	344	0,82
3 x 6,0 RE	15,3	396	0,89
4 x 6,0 RE	16,6	492	1,07
5 x 6,0 RE	18,0	598	1,27
3 x 10,0 RE	17,6	576	1,12
4 x 10,0 RE	18,9	710	1,32
5 x 10,0 RE	20,5	860	1,57

* D informatívny priemer kábla
* M informatívna hmotnosť kábla
* Q spaľovacie teplo (caloric load)

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 19.05.2008
Podpis/Signature

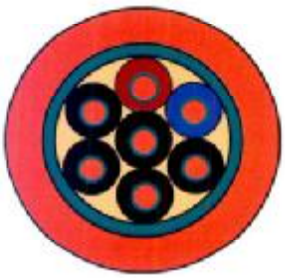
Dokument č./Document No.: FIRES-FR-063-08-PUVE

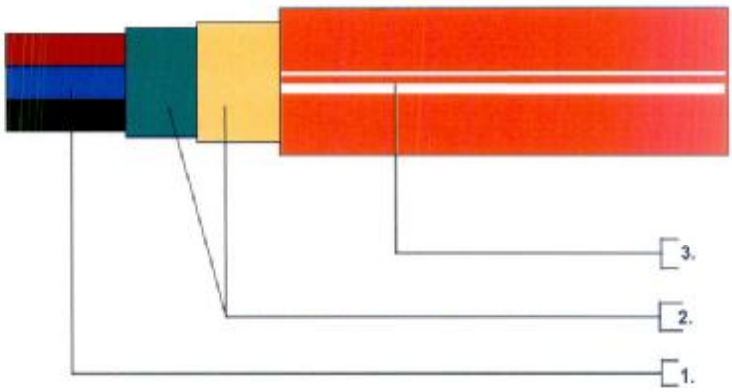
Príloha č./Appendix No.: 18

NHXH ... FE180/P90

Silové káble s medenými jadrami, s funkčnosťou **180 minút** počas a po ukončení pôsobenia ohňa podľa **STN IEC 60331-21**, so zvýšenou odolnosťou voči šíreniu plameňa podľa **STN EN 50266-2-4 (Kat. C)**, bezhalogénové s nízkou hustotou dymu vytvorenom pri horení podľa **STN EN 61034-1, -2**, a nízkou korozivitou splodín podľa **STN EN 50267-2-2, -3**, s funkčnou odolnosťou pre elektrický systém v požiari **P90** podľa **STN 92 0205**, pre menovité napätie sústavy do 0,6/1,0 kV vrátane.

Technický predpis: **TPEFK 28-04-2006/785, STN 34 7660/A3 (HD 604 S1:1994/A3:2005), DIN VDE 0266**





Konštrukcia kábla:

1. Kruhový medený vodič s kompozitnou izoláciou, ktorá pozostáva z 2x ovinu sklosľudovou izolačnou páskou, na ktorú je nanesená vrstva termosetickej, bezhalogénovej, oheň nešíriacej zmesi typu IHN 1 (HXI 1), žily sú polohovo spletané do jadra kábla.
2. Nad jadrom kábla je v súvislej vrstve vytlačovaný bezhalogénový, oheň nešíriaci výplňový obal.
3. Plášť kábla je z bezhalogénovej, oheň nešíriacej termoplastickej zmesi typu MHN 2 (HM 4)

Povolené teploty:

- pri montáži **-5° až +50°C**
- pri prevádzke **-30°C až +90°C**
- Cu jadro pri prevádzke **+90°C**

Použitie:

Káble sú určené na rozvod elektrickej energie. Môžu byť použité v prostredí s nebezpečenstvom požiaru a inštalované na horľavý povrch. Káble sú určené na pevné uloženie. Je vhodné ich použiť všade tam, kde je v prípade požiaru potrebné chrániť ľudské životy alebo majetok, napr. v priemyselných komplexoch, verejných budovách, hoteloch, na letiskách, v nemocniciach.

Menovité napätie:

- 0,6/1 kV

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 19.09.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-NHXH

Príloha č./Appendix No. 19

Technické údaje :

Farebné značenie podľa STN EN 34 7411 (HD 308 S2:2001)

	Bez ochranného vodiča				S ochranným vodičom		
Počet žil	2-O	3-O	4-O	5-O	3-J	4-J	5-J
1	●	●	●	●	●	●	●
2	●	●	●	●	●	●	●
3		●	●	●	●	●	●
4			●	●		●	●
5				●			●

Informatívne priemery, hmotnosti káblov, spaľné teplo.

Konštrukcia kábla	D [mm]	M [kg/km]	Q [kWh/m]
2 x 1,5 RE	13,2	250	0,76
3 x 1,5 RE	13,9	282	0,85
4 x 1,5 RE	15,1	320	1,00
5 x 1,5 RE	16,2	392	1,17
2 x 2,5 RE	14,1	295	0,84
3 x 2,5 RE	14,7	330	0,92
4 x 2,5 RE	16,0	406	1,12
5 x 2,5 RE	17,4	480	1,34
2 x 4,0 RE	14,9	347	0,94
3 x 4,0 RE	15,7	403	1,02
4 x 4,0 RE	17,2	495	1,25
5 x 4,0 RE	18,6	593	1,48
2 x 6,0 RE	16,1	425	1,06
3 x 6,0 RE	16,9	497	1,15
4 x 6,0 RE	18,5	620	1,40
5 x 6,0 RE	20,3	758	1,71
3 x 10,0 RE	18,8	683	1,35
4 x 10,0 RE	20,6	860	1,65
5 x 10,0 RE	22,5	1050	2,00

* D informatívny priemer kábla
* M informatívna hmotnosť kábla
* Q spaľovacie teplo (caloric load)

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 11.04.2008
Podpis/Signature

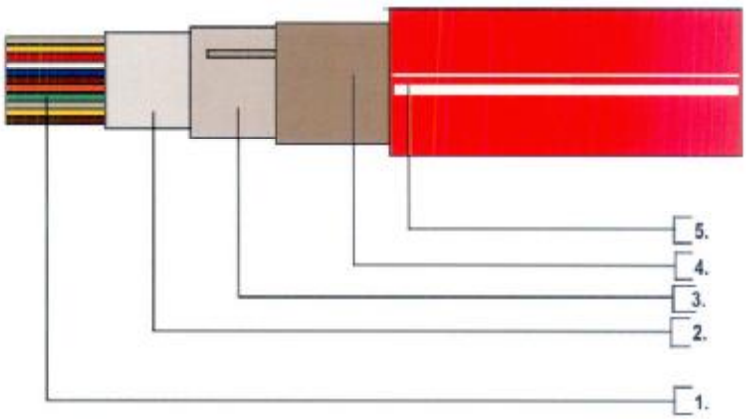
Dokument č./Document No. FIRES-FR-065-08-ARLE

Príloha č./Appendix No. 20

JE-H(St)H...FE 180/P30

Nízkofrekvenčné inštalačné, tienené káble s medenými jadrami, s funkčnosťou **180 minút** počas a po ukončení pôsobenia ohňa podľa **STN IEC 60331-23**, so zvýšenou odolnosťou voči šíreniu plameňa podľa **STN EN 50266-2-4 (kat. C)**, bezhalogénové s nízkou hustotou dymu vytvorenom pri horení podľa **STN EN 61034-1, -2** a nízkou korozivitou splodín podľa **STN EN 50267-2-2, -3**. S funkčnou odolnosťou pre elektrický systém v požiari **P30** podľa **STN 92 0205**.

Technický predpis: **TPEFK 08-12-2006/289/P30-60; DIN VDE 0815**



Konštrukcia kábla:

1. Vodič z medeného drôtu ∅ 0,8 mm, kompozitná izolácia pozostáva z 2x ovinu sklosľudovou izolačnou páskou na ktorú je nanesená vrstva termosetickej, bezhalogénovej, oheň nešíriacej zmesi typu HJ1, žily sú spletané do prvkov, ktoré sú skupinovo, alebo polohovo spletané do jadra kábla.
2. Nad jadrom sa nachádza obvodová izolácia s nehydroskopickej fólie.
3. Nad obvodovou izoláciou je púšťaná, alebo omotávaná sklotextilná oheňodolná páska.
4. Nad dušou je uložená tieniaca fólia jednostranne pokrytá vrstvou polyméru. Na zabezpečenie kontinuity tienenia je pod ňou uložený pocínovaný drôt.
5. Plášť kábla je z bezhalogénovej, oheň nešíriacej zmesi. V prípade kábla určeného na požiarnu signalizáciu je farba plášťa červená.

Povolené teploty:

- pri montáži **-5° až +50°C**
- pri prevádzke **-30°C až +70°C**

Použitie:

Káble JE-H(St)H...FE 180/P90 sú určené na prenos elektrických signálov. Môžu byť použité v prostredí s nebezpečenstvom požiaru a inštalované na horľavý povrch. Káble sú určené na pevné uloženie. Je vhodné ich použiť všade tam, kde je v prípade požiaru potrebné chrániť ľudské životy alebo majetok, napr. v priemyselných komplexoch, verejných budovách, hoteloch, na letiskách, v nemocniciach.

Špičkové napätie:

- ∅ 0,8 mm 225 V

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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 19. 09. 2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-ANNEX

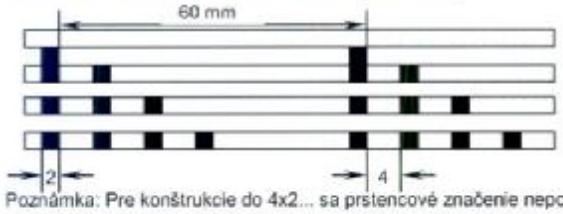
Príloha č./Appendix No. 21

Technické údaje :

Farebné značenie základných prvkov

Pár	1		2		3		4	
Žila	a	b	a	b	a	b	a	b
Farba	modrá	červená	šedá	žltá	zelená	hnedá	biela	čierna

Farebné značenie prstencových skupín



Poznámka: Pre konštrukcie do 4x2... sa prstencové značenie nepoužíva

Číslo skupiny	Farba prstenca	Číslo prsten. skupiny	Farba ident. pásky
1 2 3 4	*ružová*	I. II. III. IV.	-
5 6 7 8	*oranžová*	I. II. III. IV.	-

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 19. 09. 2008
Podpis/Signature

Dokument č. Document No. FIRES-FR-063-08-ROLE

Príloha č./Appendix No. 22

Nominálne priemery a hmotnosti káblov, výrobné dĺžky

Konštrukcia	d [mm]	m [kg/km]	l [m]
1 x 2 x 0,8	6,7	60	1 000
2 x 2 x 0,8[1)]	7,7	83	1 000
3 x 2 x 0,8	11,0	121	1 000
4 x 2 x 0,8	12,2	146	1 000
8 x 2 x 0,8	19,8	294	1 000
12 x 2 x 0,8	21,2	373	1 000
16 x 2 x 0,8	24,0	493	1 000
20 x 2 x 0,8	26,1	570	500

1) prevedenie 1x4x0,8
- d informatívny priemer kábla nad plášťom
- m informatívna hmotnosť kábla
- tolerancia výrobných dĺžok je ± 5 %

Prenosové parametre.

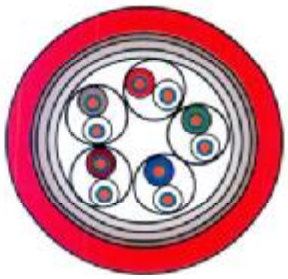
Priemer vodičov	*Ø 0,8 mm*
Maximálny odpor elektrickej slučky [(Ω/km]	*73,2*
Prevádzková kapacita páru pri 800 Hz[1)] [nF/km]	*< 120[1)]*
Kapacitná nerovnováha [pF/100m]	*< 200[2)]*
Prevádzkové napätia špičková hodnota [V]	*225*

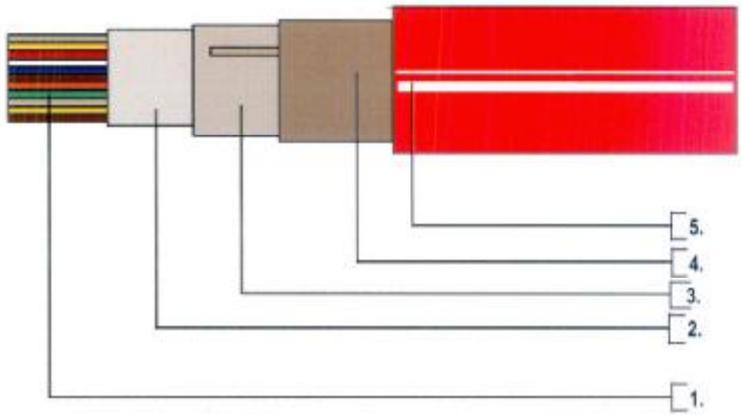
1) Pri kábloch do 4 párov môžu byť hodnoty prekročené o 20%
2) 20% hodnôt, ale najmenej jedna hodnota môže byť do 400 pF/100m

JE-H(St)H...FE 180/P90

Nízkofrekvenčné inštalačné, tienené káble s medenými jadrami, s funkčnosťou **180 minút** počas a po ukončení pôsobenia ohňa podľa **STN IEC 60331-23**, so zvýšenou odolnosťou voči šíreniu plameňa podľa **STN EN 50266-2-4 (kat. C)**, bezhalogénové s nízkou hustotou dymu vytvorenom pri horení podľa **STN EN 61034-1, -2** a nízkou korozivitou splodín podľa **STN EN 50267-2-2, -3**. S funkčnou odolnosťou pre elektrický systém v požiari **P90** podľa **STN 92 0205**.

Technický predpis: **TPEFK 11-12-2006/289/P90; DIN VDE 0815**





Konštrukcia kábla:

1. Vodič z medeného drôtu ∅ 0,8 mm, kompozitná izolácia pozostáva z 2x ovinu sklosľudovou izolačnou páskou na ktorú je nanesená vrstva termosetickej, bezhalogénovej, oheň nešíriacej zmesi typu HJ1, žily sú spletané do prvkov, ktoré sú skupinovo, alebo polohovo spletané do jadra kábla.
2. Nad jadrom sa nachádza obvodová izolácia s nehydroskopickej fólie.
3. Nad obvodovou izoláciou je púšťaná, alebo omotávaná sklotextilná oheňodolná páska.
4. Nad dušou je uložená tieniaca fólia jednostranne pokrytá vrstvou polyméru. Na zabezpečenie kontinuity tienenia je pod ňou uložený pocínovaný drôt.
5. Plášť kábla je z bezhalogénovej, oheň nešíriacej zmesi. V prípade kábla určeného na požiarnu signalizáciu je farba plášťa červená.

Povolené teploty:

- pri montáži **-5° až +50°C**
- pri prevádzke **-30°C až +70°C**

Použitie:

Káble JE-H(St)H...FE 180/P90 sú určené na prenos elektrických signálov. Môžu byť použité v prostredí s nebezpečenstvom požiaru a inštalované na horľavý povrch. Káble sú určené na pevné uloženie. Je vhodné ich použiť všade tam, kde je v prípade požiaru potrebné chrániť ľudské životy alebo majetok, napr. v priemyselných komplexoch, verejných budovách, hoteloch, na letiskách, v nemocniciach.

Špičkové napätie:

- ∅ 0,8 mm 225 V

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 14.04.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-PUVE

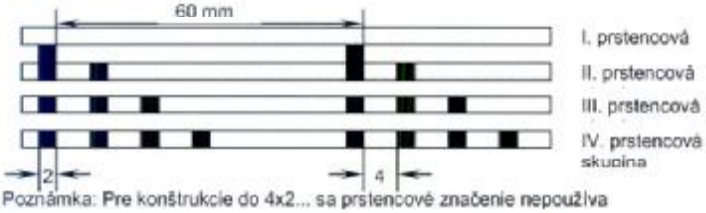
Príloha č./Appendix No. 23

Technické údaje :

Farebné značenie základných prvkov

Pár	1		2		3		4	
Žila	a	b	a	b	a	b	a	b
Farba	modrá	červená	šedá	žltá	zelená	hnedá	biela	čierna

Farebné značenie prstencových skupín



Poznámka: Pre konštrukcie do 4x2... sa prstencové značenie nepoužíva

Číslo skupiny	Farba prstenca	Číslo prsten. skupiny	Farba ident. pásky
1 2 3 4	*ružová*	I. II. III. IV.	-
5 6 7 8	*oranžová*	I. II. III. IV.	-

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE
Dátum/Date 12.05.2008
Podpis/Signature
Dokument č. Document No. FIRES-RP-063-08-ANNE
Príloha č./Appendix No. 24

Nominálne priemery a hmotnosti káblov, výrobné dĺžky

Konštrukcia	d [mm]	m [kg/km]	l [m]
1 x 2 x 0,8	6,7	60	1 000
2 x 2 x 0,8[1)]	7,7	83	1 000
3 x 2 x 0,8	11,0	121	1 000
4 x 2 x 0,8	12,2	146	1 000
8 x 2 x 0,8	19,8	294	1 000
12 x 2 x 0,8	21,2	373	1 000
16 x 2 x 0,8	24,0	493	1 000
20 x 2 x 0,8	26,1	570	500

1) prevedenie 1x4x0,8
- d informatívny priemer kábla nad plášťom
- m informatívna hmotnosť kábla
- tolerancia výrobných dĺžok je ± 5 %

Prenosové parametre.

Priemer vodičov	*Ø 0,8 mm*
Maximálny odpor elektrickej slučky [(Ω/km]	*73,2*
Prevádzková kapacita páru pri 800 Hz[1)] [nF/km]	*< 120[1)]*
Kapacitná nerovnováha [pF/100m]	*< 200[2)]*
Prevádzkové napätia špičková hodnota [V]	*225*

1) Pri kábloch do 4 párov môžu byť hodnoty prekročené o 20%
2) 20% hodnôt, ale najmenej jedna hodnota môže byť do 400 pF/100m

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE
Dátum/Date 17.04.2008
Podpis/Signature
Dokument č. / Document No. FIRES-FR-063-08-AUUE
Príloha č./Annex 25

Data 14.04 -17.04.2008

BAKS - ELKOND Badania FIRES Batizowce

Nr. Fires	*Nr. Baks*	*Symbol kaba*	*Pozycja*	*Przekrój kabla*	*Konstrukcja mocowania, odległość, obciążenie*
48	1	**N2XH EF 180/P30**	**1**	**5x1,5**	**Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80**
	2	**N2XH EF 180/P30**		**5x1,5**	
47	3	**N2XH EF 180/P30**		**5x10**	
	4	**N2XH EF 180/P30**		**5x10**	
46	5	**N2XH FE 180/P60**		**5x1,5**	
	6	**N2XH FE 180/P60**		**5x1,5**	
45	7	**N2XH FE 180/P60**		**5x10**	
	8	**N2XH FE 180/P60**		**5x10**	
40	9	**N2XH EF 180/P30**	**2**	**5x1,5**	**Korytko kablowe KC0P 400H60/... B-400/ 1.2 m / 10kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80**
	10	**N2XH EF 180/P30**		**5x1,5**	
39	11	**N2XH EF 180/P30**		**5x10**	
	12	**N2XH EF 180/P30**		**5x10**	
38	13	**N2XH FE 180/P60**		**5x1,5**	
	14	**N2XH FE 180/P60**		**5x1,5**	
37	15	**N2XH FE 180/P60**		**5x10**	
	16	**N2XH FE 180/P60**		**5x10**	
30	17	**N2XH EF 180/P30**	**3**	**5x1,5**	**Korytko siatkowe KDSO 400H60/... B-400/ 1.2 m / 20kg/m / średnica pręta 4,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80**
	18	**N2XH EF 180/P30**		**5x1,5**	
29	19	**N2XH EF 180/P30**		**5x10**	
	20	**N2XH EF 180/P30**		**5x10**	
28	21	**N2XH FE 180/P60**		**5x1,5**	
	22	**N2XH FE 180/P60**		**5x1,5**	
27	23	**N2XH FE 180/P60**		**5x10**	
	24	**N2XH FE 180/P60**		**5x10**	
15	25	**N2XH EF 180/P30**	**4**	**5x1,5**	**Korytko kablowe KC0D 400H60/... B-400/ 1.5 m / 10kg/m / grubość blachy 1,2 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80**
	26	**N2XH EF 180/P30**		**5x1,5**	
14	27	**N2XH EF 180/P30**		**5x10**	
13	28	**N2XH EF 180/P30**		**5x10**	
12	29	**N2XH FE 180/P60**		**5x1,5**	
	30	**N2XH FE 180/P60**		**5x1,5**	
11	31	**N2XH FE 180/P60**		**5x10**	
10	32	**N2XH FE 180/P60**		**5x10**	
6	33	**N2XH EF 180/P30**	**5**	**5x1,5**	**Drabinka kablowa DGOP 400H60/... B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80**
	34	**N2XH EF 180/P30**		**5x1,5**	
5	35	**N2XH EF 180/P30**		**5x10**	
4	36	**N2XH EF 180/P30**		**5x10**	
3	37	**N2XH FE 180/P60**		**5x1,5**	
	38	**N2XH FE 180/P60**		**5x1,5**	
2	39	**N2XH FE 180/P60**		**5x10**	
1	40	**N2XH FE 180/P60**		**5x10**	

Nr. Fires	*Nr. Baks*	*Symbol kaba*	*Pozycja*	*Przekrój kabla*	*Konstrukcja mocowania, odległość, obciążenie*
51	41	NHXH FE 180/P90	6	5x1,5	Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 20kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80
	42	NHXH FE 180/P90		5x1,5	
50	43	NHXH FE 180/P90		5x10	
49	44	NHXH FE 180/P90		5x10	
65B	45	JE-H(St)H... FE 180/P30		1x2x 0.8	
65A	46	JE-H(St)H... FE 180/P30		1x2x 0.8	
64B	47	JE-H(St)H... FE 180/P90		1x2x 0.8	
64A	48	JE-H(St)H... FE 180/P90		1x2x 0.8	
42	49	NHXH FE 180/P90	7	5x1,5	Korytko kablowe KC0P 400H60/... B-400/ 1.2 m / 10kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80
	50	NHXH FE 180/P90		5x1,5	
41	51	NHXH FE 180/P90		5x10	
	52	NHXH FE 180/P90		5x10	
61B	53	JE-H(St)H... FE 180/P30		1x2x 0.8	
61A	54	JE-H(St)H... FE 180/P30		1x2x 0.8	
60B	55	JE-H(St)H... FE 180/P90		1x2x 0.8	
60A	56	JE-H(St)H... FE 180/P90		1x2x 0.8	
32	57	NHXH FE 180/P90	8	5x1,5	Korytko siatkowe KDSO 400H60/... B-400/ 1.2 m / 20kg/m / średnica pręta 4,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80
	58	NHXH FE 180/P90		5x1,5	
31	59	NHXH FE 180/P90		5x10	
	60	NHXH FE 180/P90		5x10	
59B	61	JE-H(St)H... FE 180/P30		1x2x 0.8	
59A	62	JE-H(St)H... FE 180/P30		1x2x 0.8	
58B	63	JE-H(St)H... FE 180/P90		1x2x 0.8	
58A	64	JE-H(St)H... FE 180/P90		1x2x 0.8	
18	65	NHXH FE 180/P90	9	5x1,5	Korytko kablowe KC0D 400H60/... B-400/ 1.5 m / 10kg/m / grubość blachy 1,2 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80
	66	NHXH FE 180/P90		5x1,5	
17	67	NHXH FE 180/P90		5x10	
16	68	NHXH FE 180/P90		5x10	
55B	69	JE-H(St)H... FE 180/P30		1x2x 0.8	
55A	70	JE-H(St)H... FE 180/P30		1x2x 0.8	
54B	71	JE-H(St)H... FE 180/P90		1x2x 0.8	
54A	72	JE-H(St)H... FE 180/P90		1x2x 0.8	
9	73	NHXH FE 180/P90	10	5x1,5	Drabinka kablowa DGOP 400H60/... B-400/ 1.5 m / 20kg/m / grubość blachy 1,5 mm Mocowanie na prętach gwintowanych PGM10/..., ceownika CWOP 40H40/05, uchwytu UPWO do betonu za pomocą kołków rozporowych PSRO M10x 80
	74	NHXH FE 180/P90		5x1,5	
8	75	NHXH FE 180/P90		5x10	
7	76	NHXH FE 180/P90		5x10	
53B	77	JE-H(St)H... FE 180/P30		1x2x 0.8	
53A	78	JE-H(St)H... FE 180/P30		1x2x 0.8	
52B	79	JE-H(St)H... FE 180/P90		1x2x 0.8	
52A	80	JE-H(St)H... FE 180/P90		1x2x 0.8	

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Príloha č./Appendix No. 26

Nr. Fires	*Nr. Baks*	*Symbol kaba*	*Pozycja*	*Przekrój kabla*	*Konstrukcja mocowania, odległość, obciążenie*
63B	81	**JE-H(St)H... FE 180/P30**	11	1x2x 0.8	**Mocowanie co 0.6 m na uchwytach kablowych UDF... do betonu za pomocą kołków rozporowych SRO M6x 30**
63A	82	**JE-H(St)H... FE 180/P30**		1x2x 0.8	
62B	83	**JE-H(St)H... FE 180/P90**		1x2x 0.8	
62A	84	**JE-H(St)H... FE 180/P90**		1x2x 0.8	
44	85	**N2XH EF 180/ P30**		5x1,5	
	86	**N2XH EF 180/ P30**		5x1,5	
43	87	**N2XH EF 180/ P30**		5x10	
	88	**N2XH EF 180/ P30**		5x10	
36	89	**N2XH FE 180/P60**	12	5x1,5	**Mocowanie co 0.6 m na uchwytach kablowych UFF... do betonu za pomocą kołków rozporowych SRO M6x 30**
	90	**N2XH FE 180/P60**		5x1,5	
35	91	**N2XH FE 180/P60**		5x10	
	92	**N2XH FE 180/P60**		5x10	
34	93	**NHXH FE 180/P90**		5x1,5	
	94	**NHXH FE 180/P90**		5x1,5	
33	95	**NHXH FE 180/P90**		5x10	
	96	**NHXH FE 180/P90**		5x10	
57B	97	**JE-H(St)H... FE 180/P30**	13	1x2x 0.8	**Korytko siatkowe KDSO 60H60/... B-60/ 1.2 m / 1,5kg/m / średnica pręta 4,5 mm Mocowanie na prętach gwintowanych PGM6/... do betonu za pomocą tuleji stalowych rozporowych TSRO M6x30**
57A	98	**JE-H(St)H... FE 180/P30**		1x2x 0.8	
56B	99	**JE-H(St)H... FE 180/P90**		1x2x 0.8	
56A	100	**JE-H(St)H... FE 180/P90**		1x2x 0.8	
26	101	**N2XH EF 180/P30**		5x1,5	
25	102	**N2XH EF 180/P30**		5x10	
24	103	**N2XH EF 180/P30**		5x1,5	
23	104	**N2XH EF 180/P30**		5x10	
22	105	**NHXH FE 180/P90**		5x1,5	
21	106	**NHXH FE 180/P90**		5x10	
20	107	**NHXH FE 180/P90**		5x1,5	
19	108	**NHXH FE 180/P90**		5x10	

Lp	Symbol kaba	Średnica kabla	Ciężar kabla	
1	**N2XH EF 180/ P30 5x1,5**	15mm	0,33 kg/m	
2	**N2XH EF 180/ P30 5x10**	19 mm	0,95 kg/m	
3	**N2XH FE 180/P60 5x1,5**	15,3mm	0,33 kg/m	
4	**N2XH FE 180/P60 5x10**	21,5mm	0,95 kg/m	
5	**NHXH FE 180/P90 5x1,5**	16,6 mm	0,33 kg/m	
6	**NHXH FE 180/P90 5x10**	22,5 mm	0,95 kg/m	
7	**JE-H(St)H... FE 180/P30 2x2x 0.8**	6,7mm	0,05 kg/m	
8	**JE-H(St)H... FE 180/P90 2x2x 0.8**	6,5 mm	0,05 kg/m	

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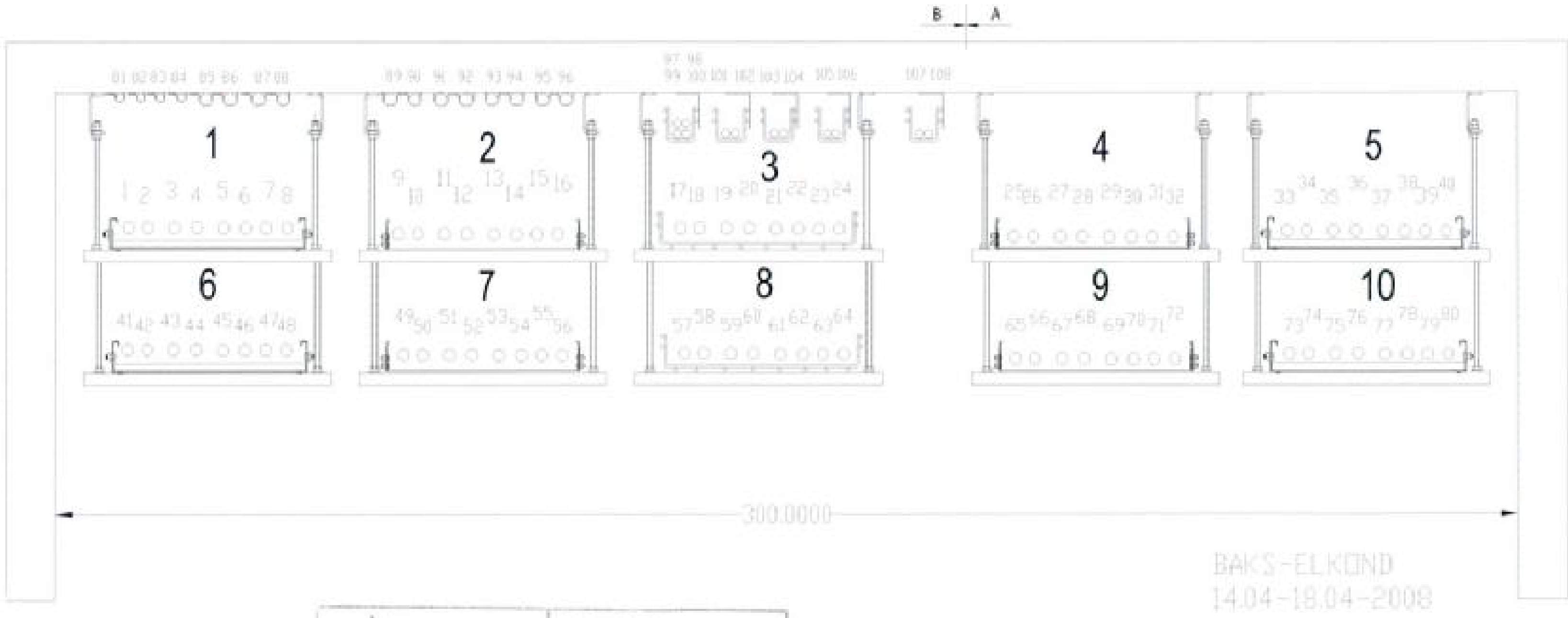
Príloha č./Appendix No. 21



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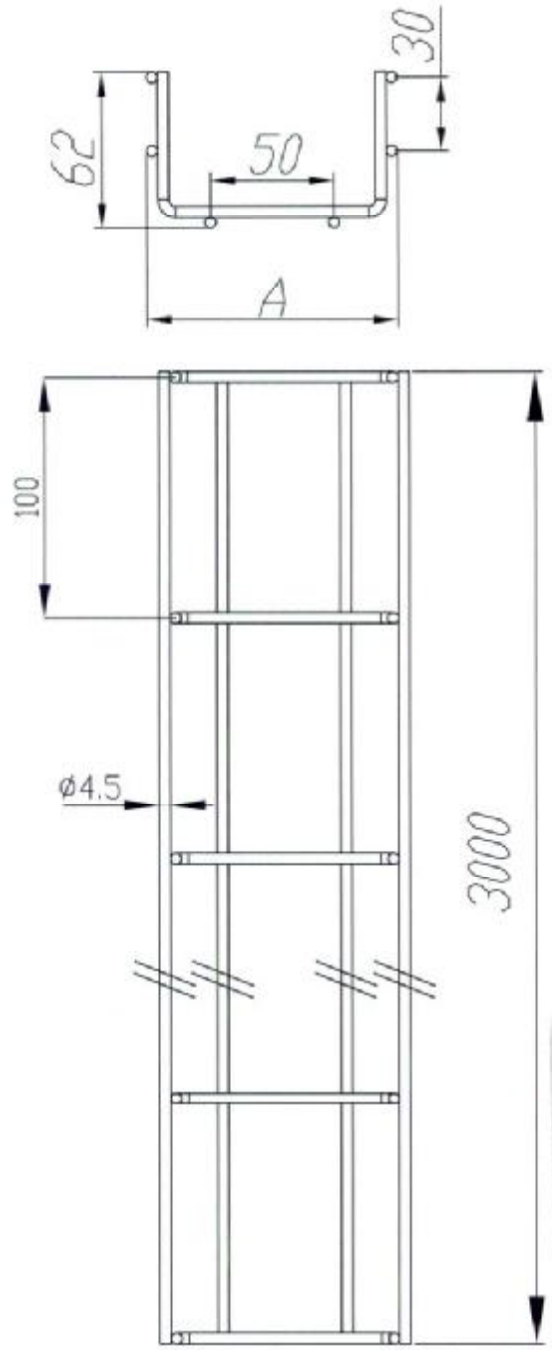
Dokument č. / Document No.	FIRES-FR-083-08-AUNE
Príloha č./Appendix No.	28

Profesjonalne Systemy Tras Kablowych

1:10

A4



A	Typ
100	KDS□100H60/3
150	KDS□150H60/3
200	KDS□200H60/3
300	KDS□300H60/3
400	KDS□400H60/3

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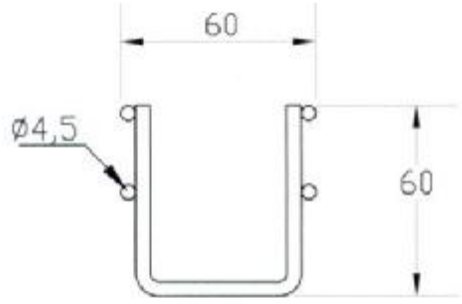
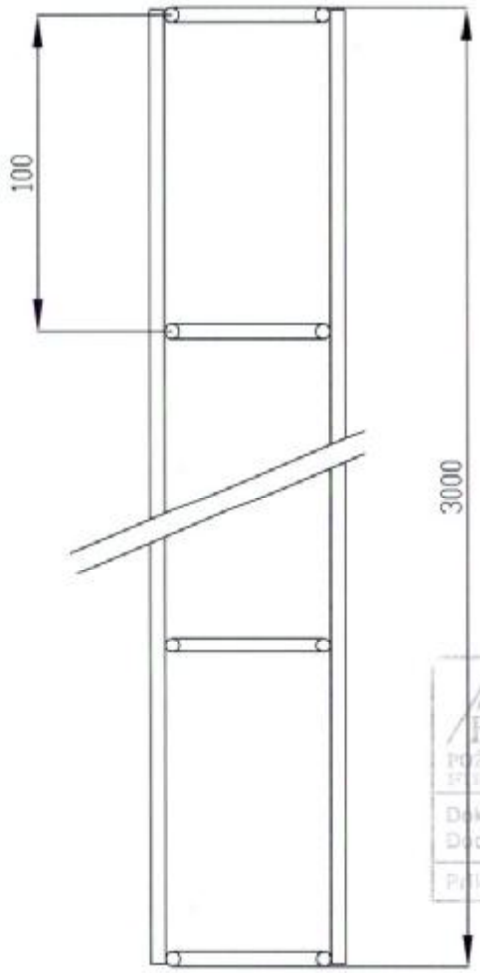
Príloha č./Appendix No. 29

	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	gat. 1.4..	Masa [kg]	Podziałka	Format A4
				Nr normy	EN 10088	--		Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1

Projektował				Nazwa rysunku	
Rysował	JRudak		18-01-08	Korytko siatkowe KDS□ 100÷400H60	
Sprawdził	JKliczek		18-01-08		
Zatwierdził	JKliczek		18-01-08	Nr programu maszynowego ---	Nr zmiany
				Nr rysunku	

Profesjonalne Systemy
Tras Kablowych





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18.09.2008
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Dokument č.
Document No. FIRES-FR-065-08-AWS

Príloha č./Appendix No. 30

Odchyłki wymiarów nietolerowanych	Materiał	Gatunek	DH18N9 1.4301	Masa [kg]	Podziałka	Format	A4
		Nr normy				Arkuszy	1
		półfabrykat (nr normy)		--	1:2	Arkusz	1

	Nazwisko	Podpis	Data
Projektował	T.Grudniewski		03.17.04
Rysował	T.Grudniewski		03.17.04
Sprawdził	J.Kliczek		03.17.04
Zatwierdził	J.Kliczek		03.17.04

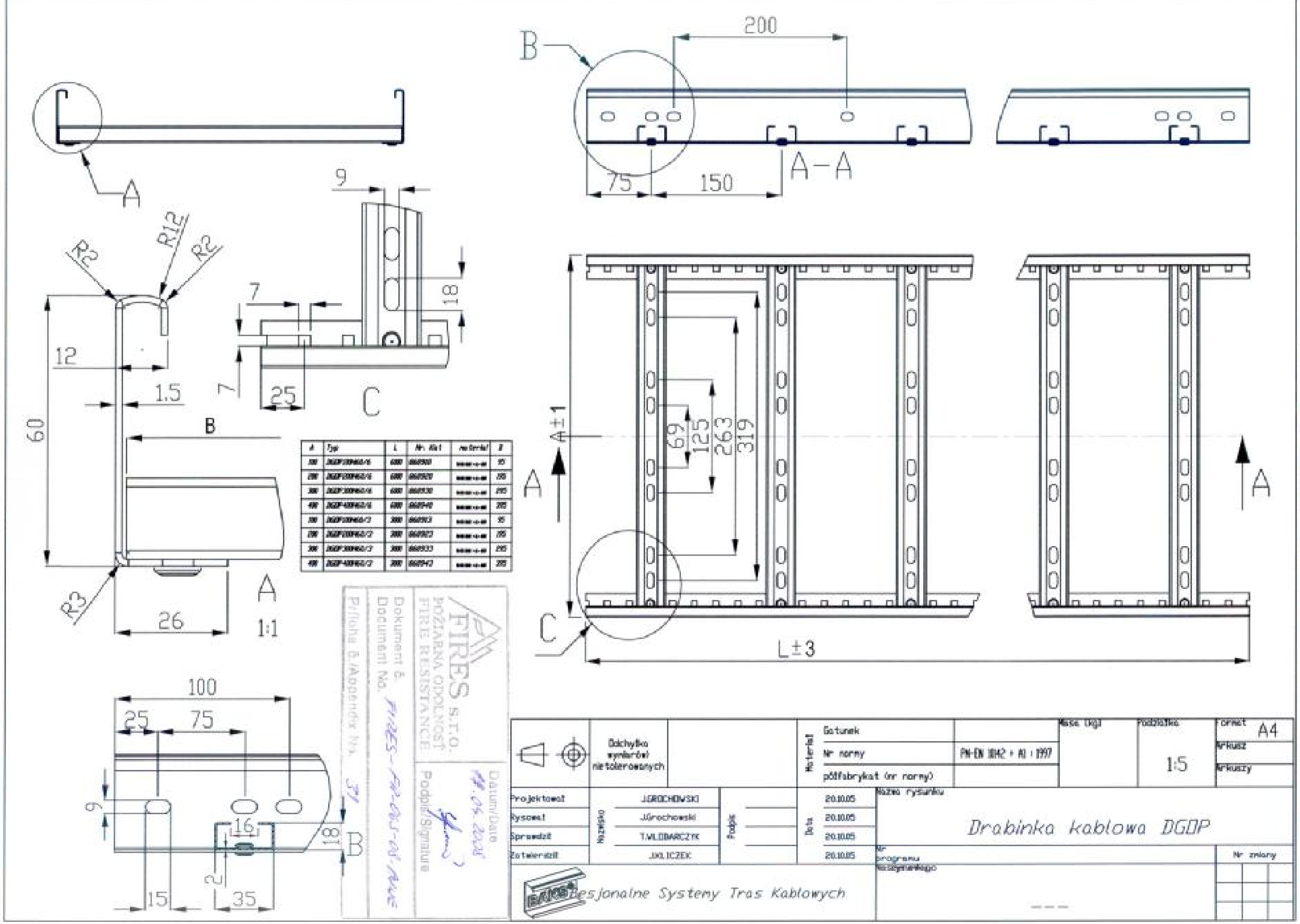
Nazwa rysunku: KDSD60H60

Nr programu maszynowego: ---

Nr zmiany

Nr rysunku

Profesjonalne Systemy
Tras Kablowych



A	Typ	L	Nr. Kat	materiał	B
100	DGDP100H60/6	6000	[illegible]	[illegible]	[illegible]
200	DGDP200H60/6	6000	[illegible]	[illegible]	[illegible]
300	DGDP300H60/6	6000	[illegible]	[illegible]	[illegible]
400	DGDP400H60/6	6000	[illegible]	[illegible]	[illegible]
100	DGDP100H60/3	3000	[illegible]	[illegible]	[illegible]
200	DGDP200H60/3	3000	[illegible]	[illegible]	[illegible]
300	DGDP300H60/3	3000	[illegible]	[illegible]	[illegible]
400	DGDP400H60/3	3000	[illegible]	[illegible]	[illegible]

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Dokument č. / Document No.: FIRES-FR-063-08-AUE

Príloha č./Appendix No.: 37

Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa (kg)	Podziałka 1:5	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

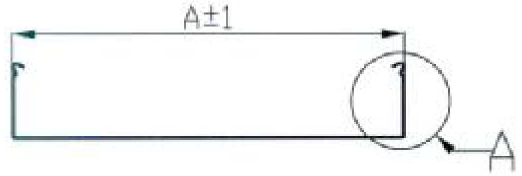
Nazwa rysunku: Drabinka kablowa DGDP

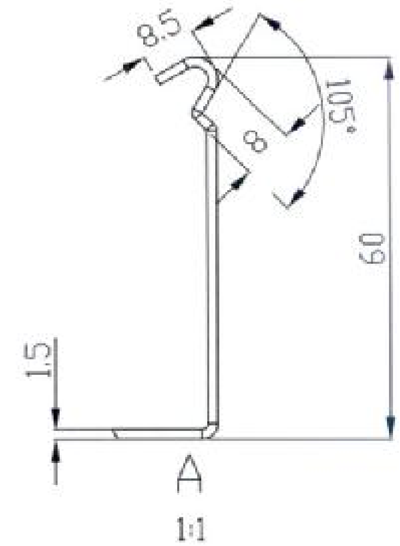
Nr programu rozdzielniczego: ---

Nr zmiany

BAKS Profesjonalne Systemy Tras Kablowych

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





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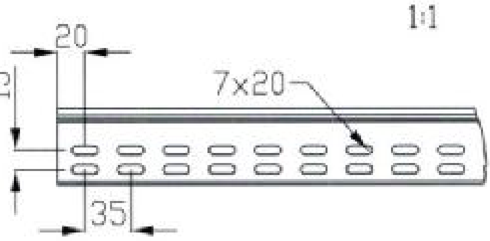
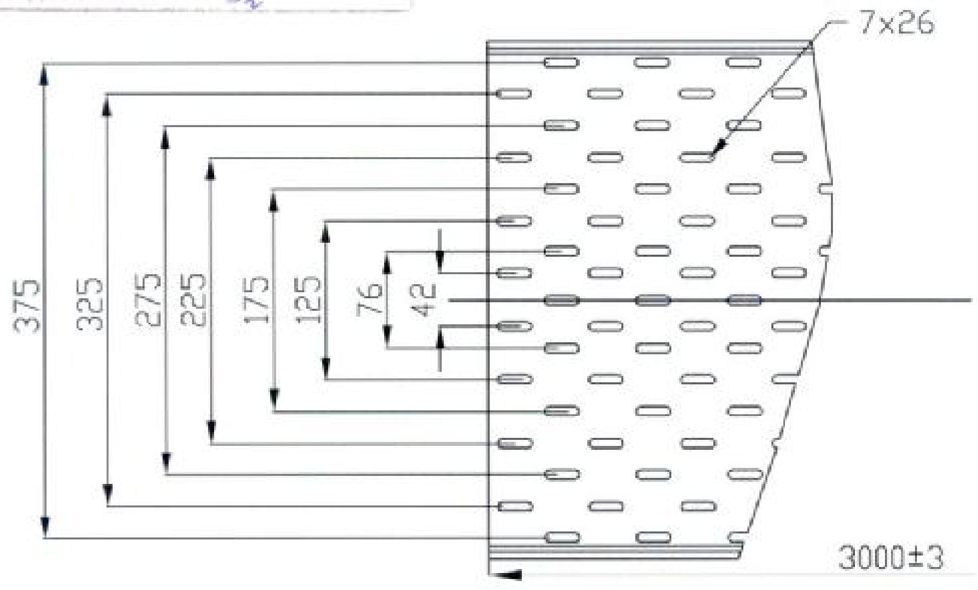
Dokument č. / Document No.: FIRES-FR-063-08-AUUE

Príloha č./Appendix No.: 32





Odchyłki wymiarów nietolerowanych		Materiał	Gatunek	
			Nr normy	PN-EN 10142 + A1 : 1997
			półfabrykat (nr normy)	

Masa [kg] | Podziałka | Format A4 | Arkusz | Arkuszy

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

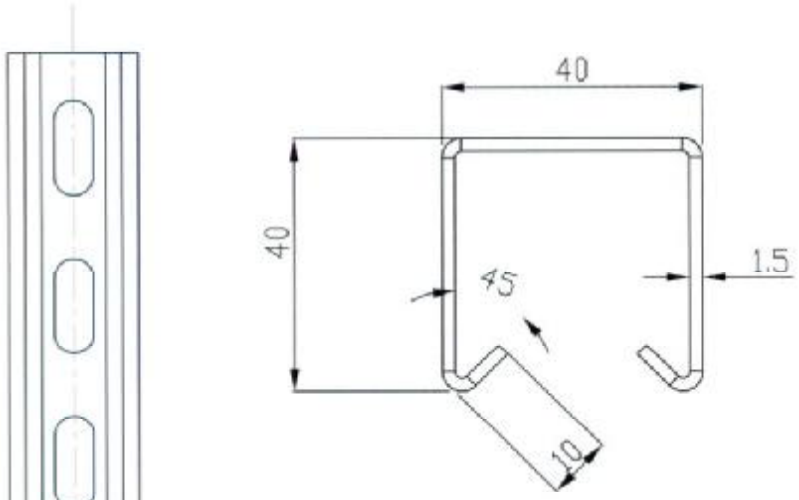
Nazwa rysunku: KCOP400H60/3N

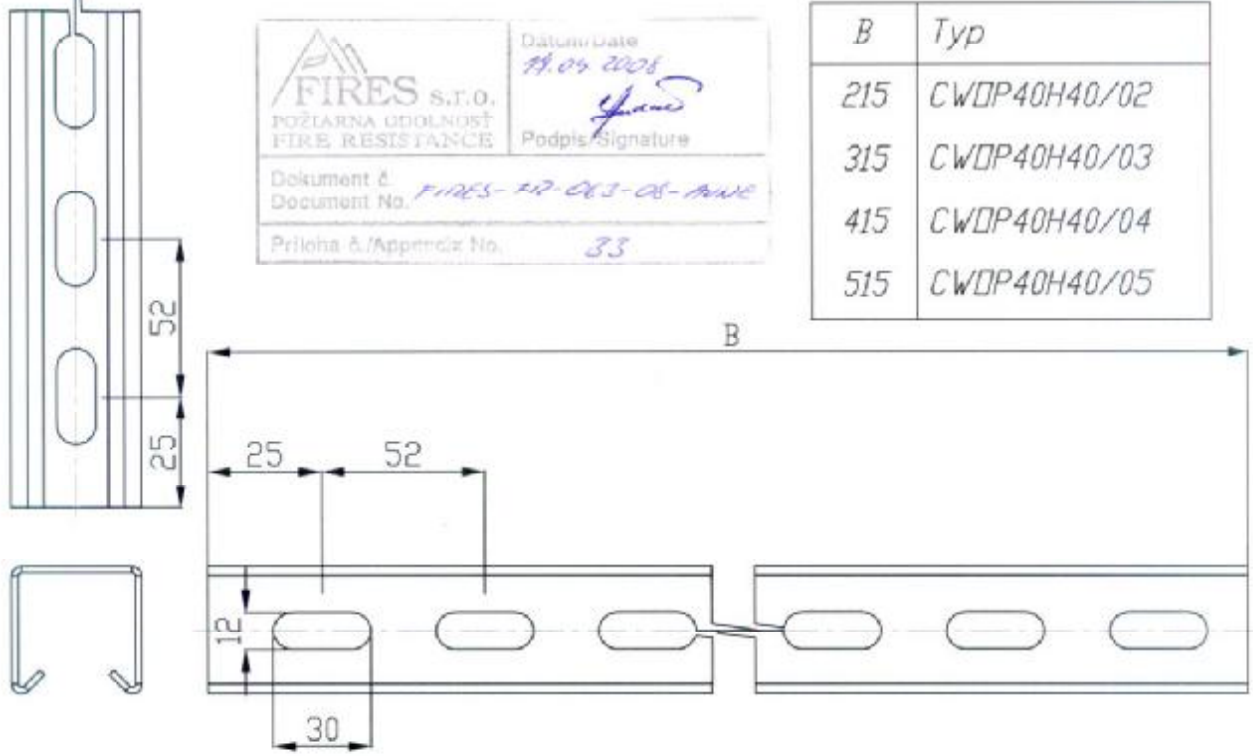
Nr programu maszynowego

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 862040





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Dokument č./Document No. FIRES-RP-083-08-ANNEX

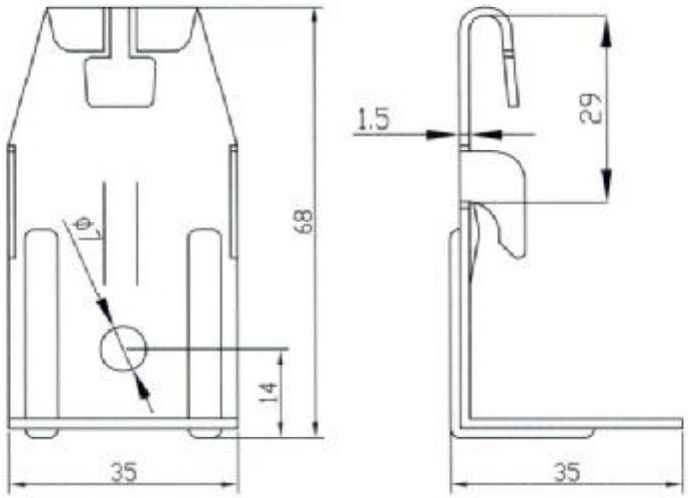
Príloha č./Appendix No. 33

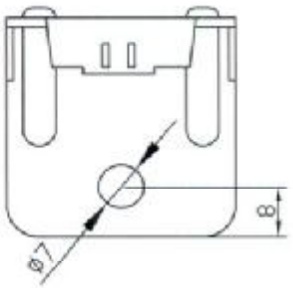
B	Typ
215	CWP40H40/02
315	CWP40H40/03
415	CWP40H40/04
515	CWP40H40/05

Ostrożna wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format	A4
			Nr normy	PN-EN 10327:2005		1:2	Arkusz	
			półfabrykat (nr normy)				Arkuszy	
Projektował	J.GRODCHEWSKI		29.10.05	Nazwa rysunku				
Rysował	J.Grochowski		29.10.05	CWP40H40/...				
Sprawdził	T.WŁODARCZYK		29.10.05					
Zatwierdził	J.KLICZEK		29.10.05				Nr zmiany	

Profesjonalne Systemy Tras Kablowych

Nr rysunku





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Dokument č./Document No. FIRES-FR-063-04-PAVE

Príloha č./Appendix No. 34

Odchyłki wymiarów nietolerowanych		Materiał	Gatunek	S13S	Masa [kg]	Podziałka 1:1	Format A4
			Nr normy	PN-EN 10142 + A1 : 1997			Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1

Projektował	Nazwisko	Podpis	Data 16.12.2007	Nazwa rysunku: WIESZAK KORYTKA SIATKOWEGO WKS060
Rysował				
Sprawdził				
Zatwierdził				Nr programu maszynowego ---

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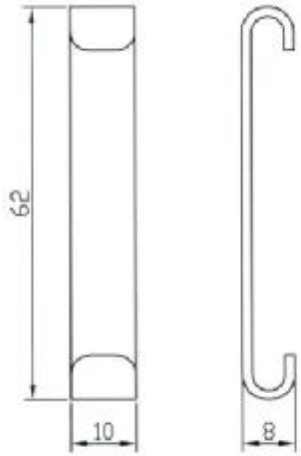
Nr rysunku

Nr zmiany



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Dátum/Date 14.04.2008

Podpis/Signature

Dokument č. / Document No.: FIRES-PR-063-08-ANJ

Príloha č./Appendix No.: 35

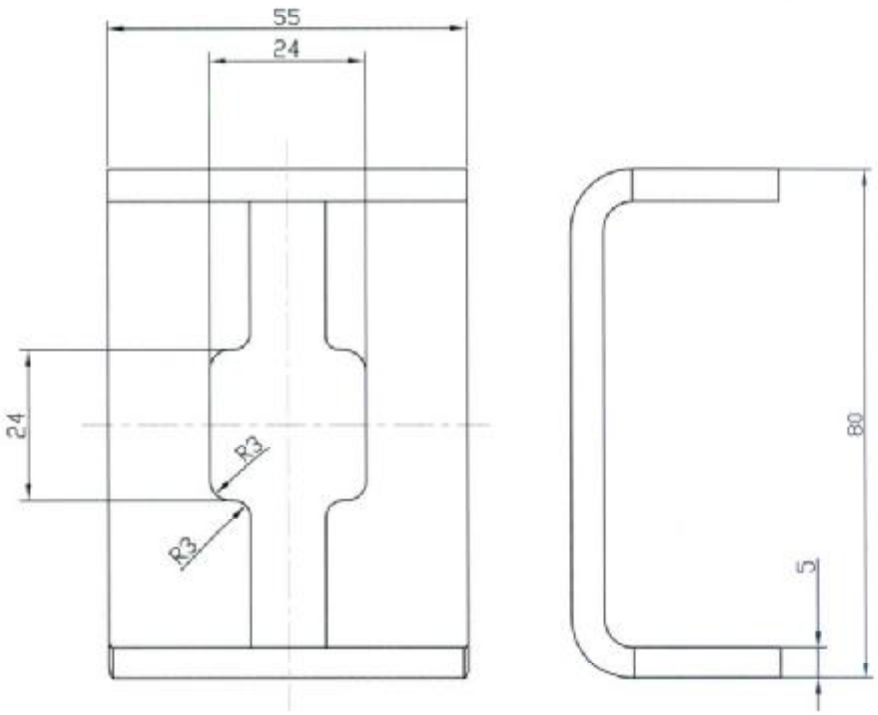
Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	S235	Masa [kg]	Podziałka 1:1	Format A4
			Nr normy	PN-EN 10142 + A1 : 1997			Arkuszy 1
			półfabrykat (nr normy)				Arkusz 1

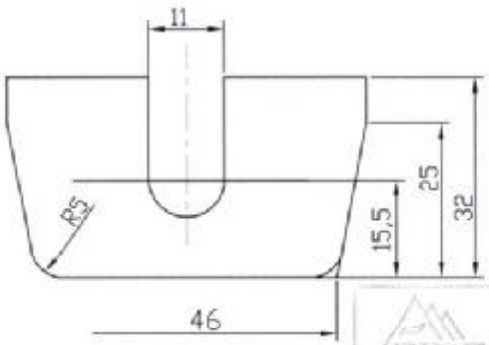
Projektował	Nazwisko	Podpis	Data 10.12.2007	Nazwa rysunku: SPINKA KORYTKA SIATKOWEGO SPS060
Rysował				
Sprawdził				
Zatwierdził				Nr programu maszynowego: ---

Profesjonalne Systemy Tras Kablowych

Nr rysunku

Nr zmiany





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FIRE RESISTANCE

Datum/Date 11. 05. 2001

Podpis/Signature

Dokument č. / Document No. FIRES-FR-065-01-NAVE

Prílohe č./Appendix No. 36

	Dáchyłka wymiarów nietolerowanych		Materiał	Gatunek	S13S	Masa [kg]	Podziałka 1:1	Format A4
				Nr normy				Arkusz 1
				półfabrykat (nr normy)				Arkuszy 1

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

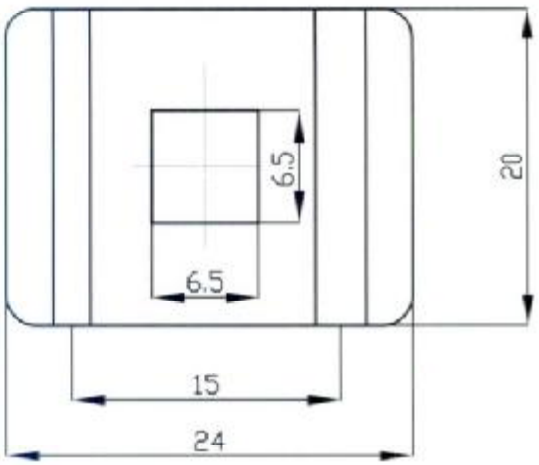
Nazwa rysunku: USDV

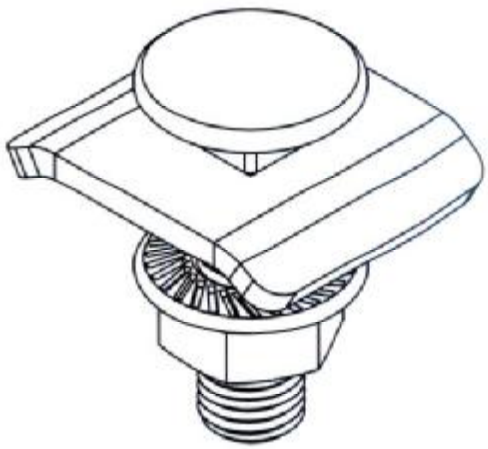
Nr programu maszynowego: ---

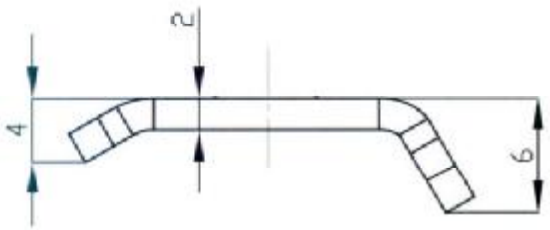
Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 803700







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FIRE RESISTANCE

Dátum/Date 14.04.2008

Podpis/Signatura

Dokument č./Document No. FIRES-FR-063-08-ANNEX

Príloha č./Appendix No. 3

	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005			Arkuszy
				półfabrykat (nr normy)				Arkuszy

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

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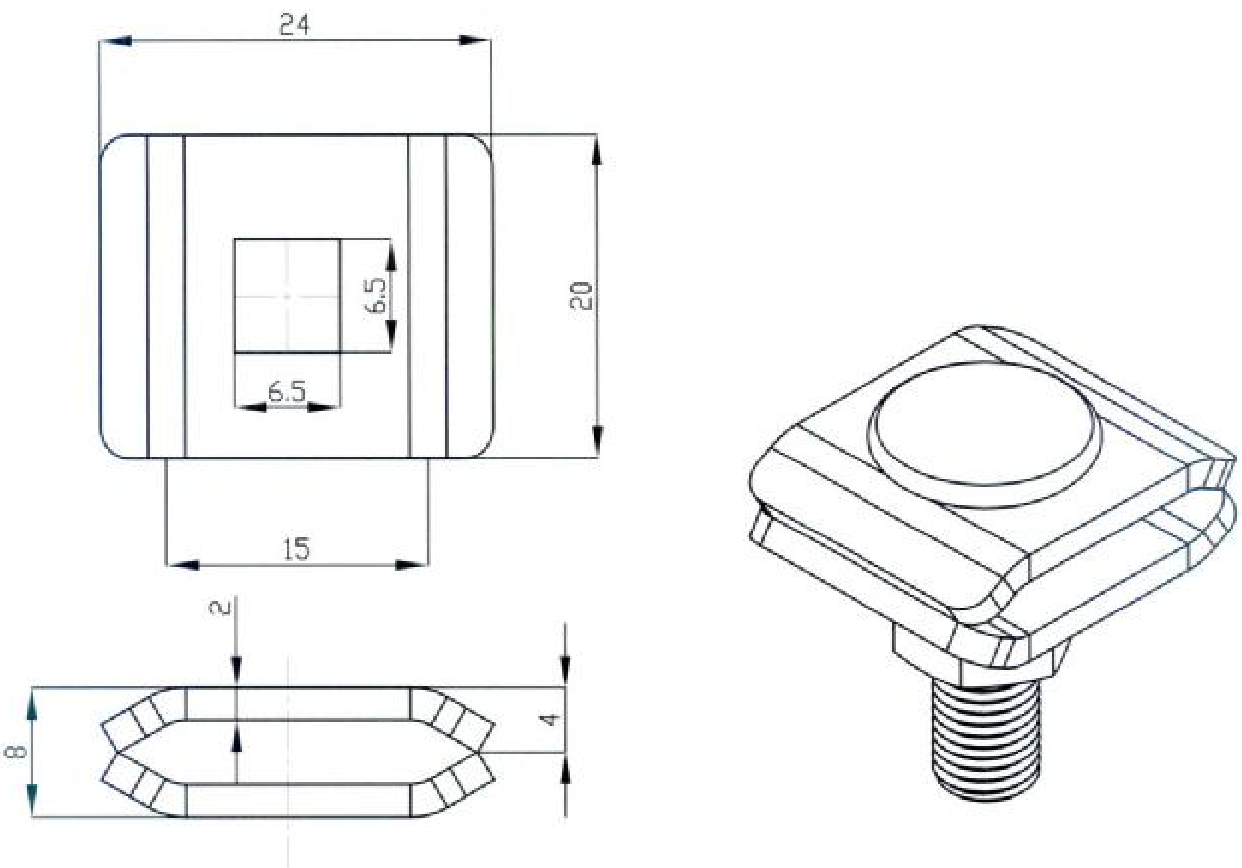
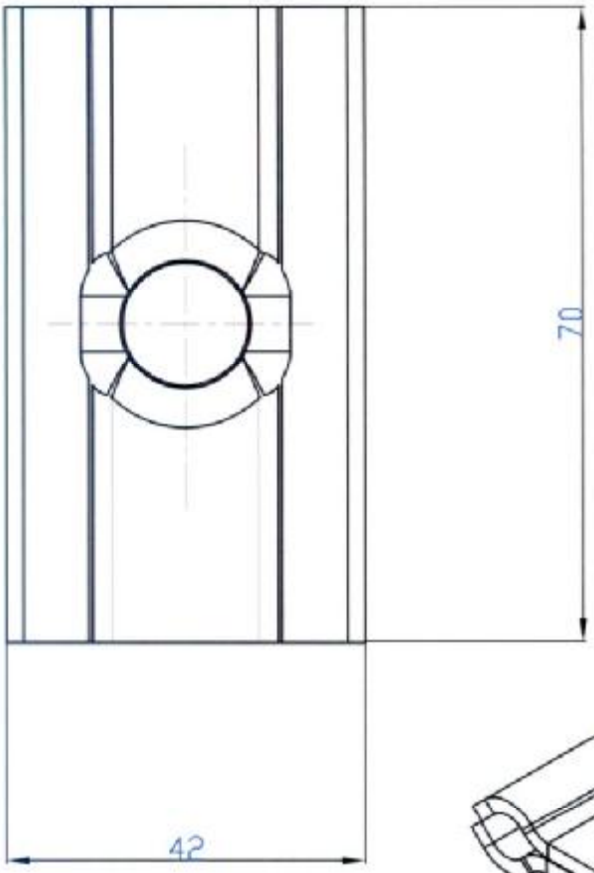
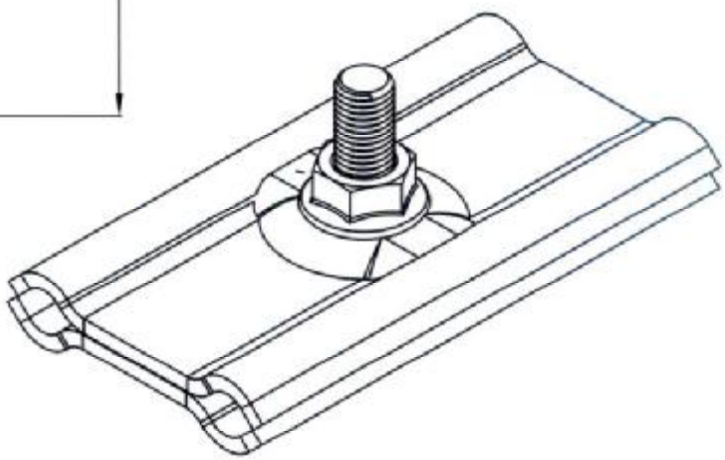
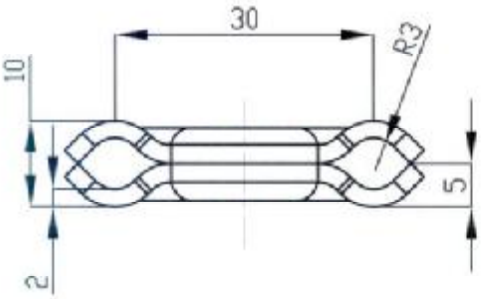
Nr rysunku: 8



Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	St3S	Masa [kg]	Podziałka	Format A4
			Nr normy	PN-EN 10142 + A1 : 1997			Arkusz 1
			półfabrykat (nr normy)				Arkuszy 1
Projektował	Nazwisko: M.Stawkowski	Podpis	Data: 10.12.2007	Nazwa rysunku			
Rysował	M.Stawkowski			Ucwyt śrubowy USS□			
Sprawdził							
Zatwierdził				Nr programu maszynowego: ---			Nr zmiany
BAKS Profesjonalne Systemy Tras Kablowych				Nr rysunku: 3			







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FIRE RESISTANCE

Datum/Date 19.04.2008

Podpis/Signature

Dokument č./Document No. FIRES-FR-063-08-RNVE

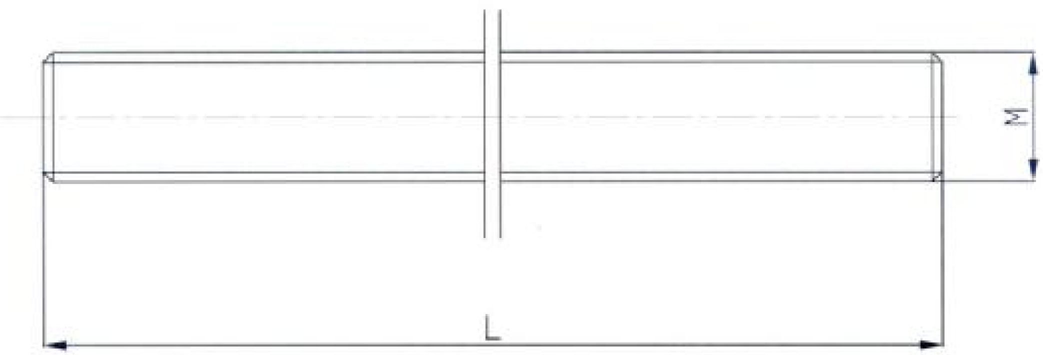
Príloha č./Appendix No. 39

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

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

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 6



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Dokument č. Document No. FIRES-FR-063-08-AUE	
Príloha č./Appendix No. 40	

M	L
6	2000
8	2000
10	1000

Odchyłka wymiarów nietolerowanych	Materiał	Gatunek	5,8	Masa (kg) ---	Podziałka 2:1
		Nr normy	------------		Format A4
		półfabrykat (nr normy)			Arkusz 1 / Arkuszy 1

	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: **PRĘT GWINTOWANY**

Nr programu maszynowego: ---

Nr zmiany

BAKS Profesjonalne Systemy Tras Kablowych

Nr rysunku: 651001