TEST REPORT FIRES-FR-061-08-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-061-08-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

Dätwyler Kabel+Systeme GmbH, Lilienthalstrasse 17,
DE-85399 Hallbergmoos – producer of cables

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

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Task No.: PR-08-0055
Specimen received: 31. 03. 2008
Date of the fire test: 03. 04. 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 power and communication non-halogen cables with circuit integrity maintenance. Persons witnessing the test:

Representatives of the sponsor: Mr. Kliczek (BAKS)
Mr. Matysiak (BAKS)
Mr. Fischer (Dätwyler)
Mr. Czarnecki (Dätwyler)

Test directed by: Mr. Štefan Rástocký
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 Dätwyler.

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 and power and communication non-halogen cables business Dätwyler Kabel.

Cables:	(N)HXH 4x1,5 RE FE180 E90	(12 x)
	(N)HXH 4x50 RM FE180 E90	(8 x)
	(N)HXCH 4x1,5/1,5 RE FE180 E90	(6 x)
	(N)HXCH 4x50/25 RM FE180 E90	(2 x)
	JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	(14 x)
	JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	(14 x)

Suspension track No. 1: was made of three consoles combined of two horizontal supports (type CWOP40H40/05) and two threaded bar (type PGM8/1x600) with washers and nuts M8 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. 2: was made of three consoles (type WKSO60) and three threaded bar (type PGM6/1x300) with washers and nuts M6 which were fixed to ceiling by dowels (type TRSO 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. 3: was made of three consoles (type WKSO60) and three threaded bar (type PGM6/1x300) with washers and nuts M6 and three hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PRSO M8x75) 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 three consoles combined of horizontal support (type CWOP40H40/05) and two threaded bar (type PGM8/1x300) with washers and nuts M8 and two hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PRSO M8x75) 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 10 kg/m.
Suspension track No. 5: was made of three consoles combined of horizontal support (type CWOP40H40/05) and two threaded bar (type PGM8/1x300) with washers and nuts M8 and two hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PRSO M8x75) 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 three consoles combined of horizontal support (type CWOP40H40/05) and two threaded bar (type PGM8/1x300) with washers and nuts M8 and two hangers (type ZK8) which were fixed to steel profiles I 80. These profiles were fixed to ceiling by ten dowels (type PRSO M8x75) 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 10 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
46,8	2,1	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]**
03. 04. 2008	45,7	11,3

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 (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 3, 4: cables (N)HXH 4x50 RM FE180 E90	**90 minutes no failure/interruption**
Specimens 5, 6: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 7, 8: cables (N)HXCH 4x50/25 RM FE180 E90	**90 minutes no failure/interruption**
Specimens 9, 10: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimen 11: cable (N)HXH 4x1,5 RE FE180 E90	**69 minutes**
Specimen 12: cable (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 13, 14: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 15, 16: cables (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 17, 18: cables (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 19, 20: cables (N)HXH 4x50 RM FE180 E90	**90 minutes no failure/interruption**
Specimens 21, 22: cables (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimens 23, 24: cables (N)HXH 4x50 RM FE180 E90	**90 minutes no failure/interruption**
Specimen 25: cable (N)HXH 4x1,5 RE FE180 E90	**90 minutes no failure/interruption**
Specimen 26: cable (N)HXH 4x1,5 RE FE180 E90	**85 minutes**
Specimens 27, 28: cables (N)HXH 4x50 RM FE180 E90	**90 minutes no failure/interruption**
Specimen 52: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**31 minutes**
Specimen 53: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**52 minutes**
Specimen 54: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**50 minutes**
Specimen 55: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 56: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**43 minutes**
Specimen 57: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**48 minutes**
Specimen 58: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**28 minutes**
Specimen 59: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 60: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 61: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**71 minutes**
Specimen 62: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**21 minutes**
Specimen 63: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**61 minutes**
Specimen 64: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**31 minutes**
Specimen 65: cable JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 66: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**79 minutes**
Specimen 67: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**72 minutes**
Specimens 68, 69: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 70: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**62 minutes**
Specimen 71: cable JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**71 minutes**
Specimen 72: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**49 minutes**
Specimen 73: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**90 minutes no failure/interruption**
Specimen 74: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	**36 minutes**
Specimen 75: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	**60 minutes**

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

Specimens S1 – S28 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S75 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

SKÚŠOBNÉ LABORATÓRIUM • PRÜFLABORATORIUM • 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

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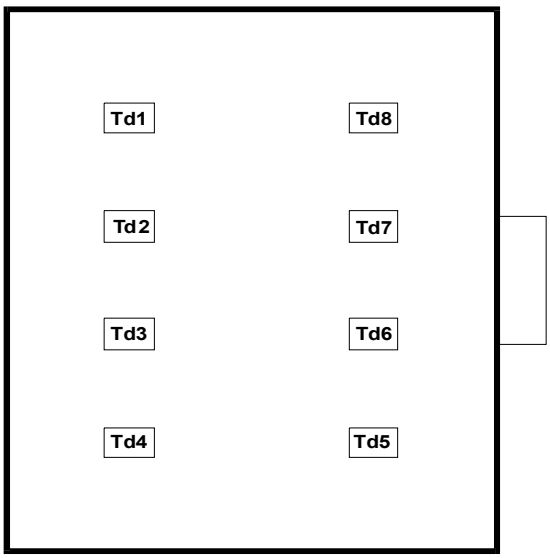
Measured values inside the test furnace

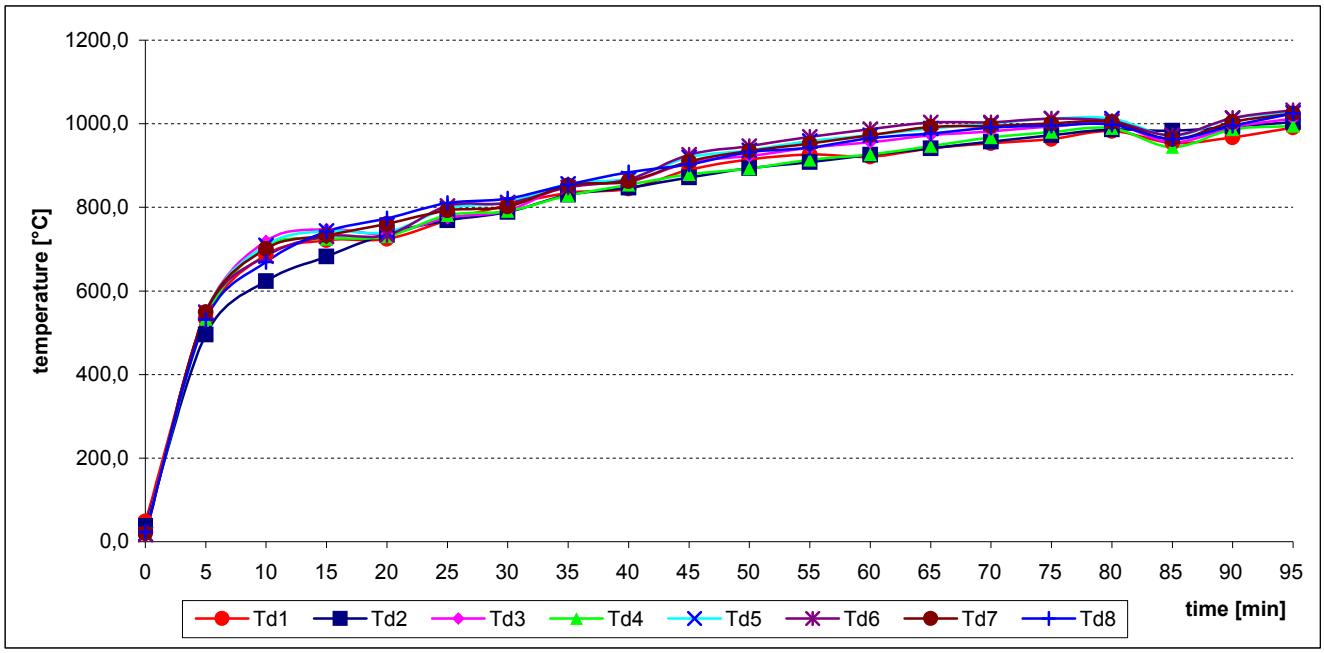
Time t [min]	Temperature [°C]											Deviation d_e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	48,1	37,3	24,9	23,7	18,1	16,9	19,8	22,7	26,4	20,0	12,7	0,0	0,0
5	533,2	495,6	546,7	533,3	548,3	548,9	548,8	531,7	535,8	576,2	12,5	-6,3	13,8
10	686,4	623,7	718,7	706,1	709,4	682,9	701,0	669,3	687,2	678,3	12,0	-5,5	16,9
15	721,7	682,3	747,7	724,7	743,6	730,2	732,8	742,0	728,1	738,5	11,2	-3,4	18,2
20	724,5	736,9	737,0	730,9	740,9	733,7	760,1	773,5	742,2	781,3	11,2	-3,5	19,1
25	769,0	769,2	775,0	781,4	797,1	803,5	792,8	810,0	787,3	814,6	11,3	-3,7	19,4
30	805,6	788,5	792,1	791,4	812,0	810,1	801,9	820,7	802,8	841,8	11,1	-3,7	17,4
35	834,9	830,0	853,0	828,6	856,0	847,9	852,4	854,3	844,6	864,8	10,9	-3,5	18,5
40	844,6	846,6	860,7	853,7	868,8	866,9	862,1	883,8	860,9	884,7	10,9	-3,4	19,0
45	890,0	871,3	907,3	878,8	919,7	925,7	909,5	903,1	900,7	902,3	11,0	-3,1	19,2
50	914,1	893,3	922,4	892,6	936,2	946,6	935,4	931,8	921,6	918,1	11,2	-2,7	18,1
55	926,5	908,1	942,9	913,9	958,8	968,5	953,0	942,8	939,3	932,3	11,2	-2,4	18,2
60	921,3	925,5	955,5	926,7	972,2	987,2	972,6	965,9	953,4	945,3	11,2	-2,1	18,4
65	941,3	941,3	972,7	946,6	988,8	1003,0	992,1	976,2	970,3	957,3	11,0	-1,8	19,1
70	953,4	957,5	981,6	966,9	1001,0	1003,0	994,5	990,7	981,1	968,4	11,2	-1,5	17,3
75	963,5	972,6	993,1	979,9	1012,0	1012,0	1001,0	995,7	991,2	978,7	11,2	-1,3	15,8
80	982,7	986,6	1001,0	989,1	1012,0	1006,0	1004,0	997,7	997,4	988,4	11,0	-1,1	15,8
85	953,9	983,2	955,7	943,9	971,0	972,3	963,0	963,1	963,3	997,4	11,0	-1,2	11,1
90	967,2	993,6	991,7	986,7	1013,0	1014,0	1004,0	995,2	995,7	1005,9	11,1	-1,3	14,3
95	991,3	1004,0	1012,0	994,4	1026,0	1032,0	1025,0	1025,0	1013,7	1014,0	11,2	-1,2	15,6

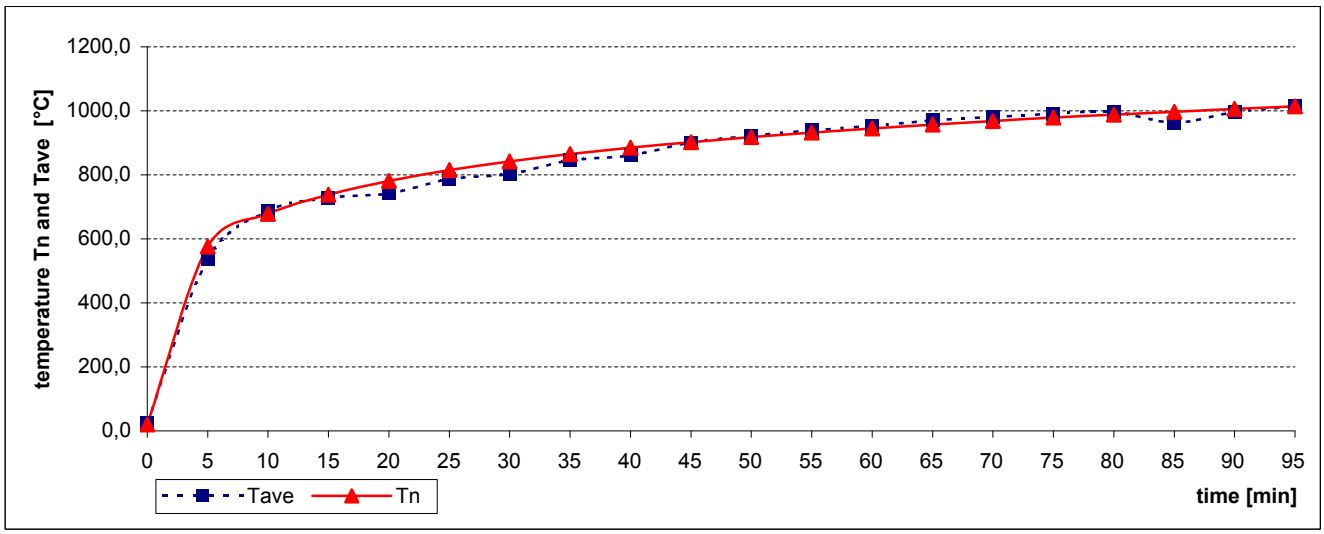
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

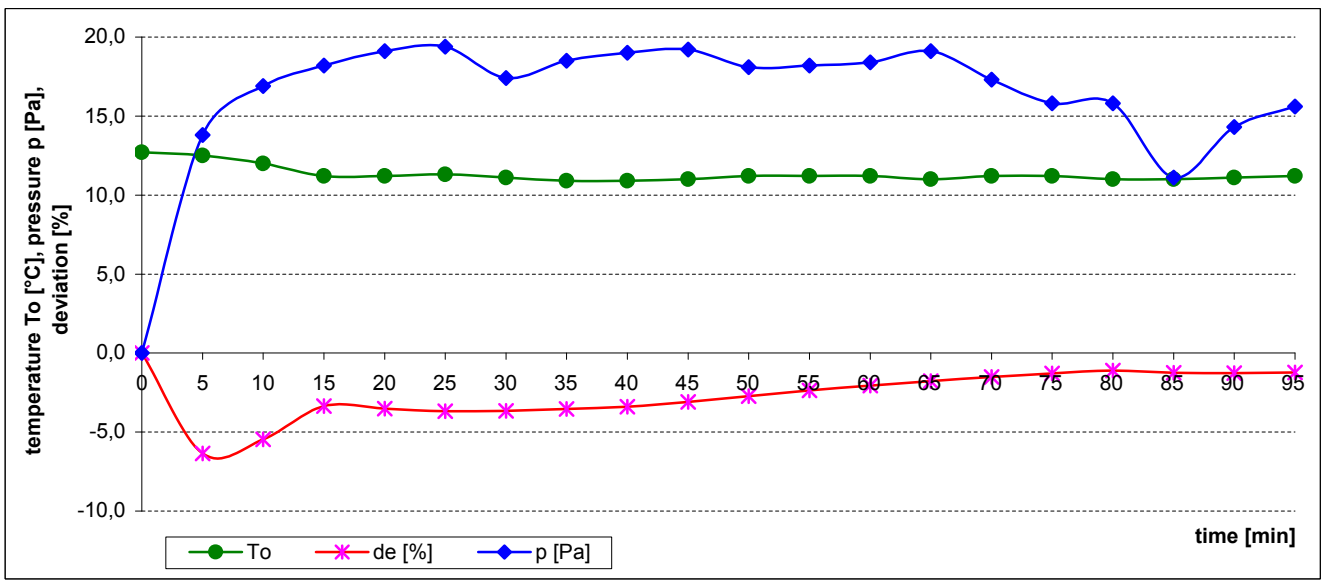
Layout of measuring points in the test furnace:



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	no failure / interruption
	2-L2	no failure / interruption
	3-L3	no failure / interruption
	4-PEN	no failure / interruption
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	no failure / interruption
	10-L2	no failure / interruption
	11-L3	no failure / interruption
	12-PEN	no failure / interruption
S4	13-L1	no failure / interruption
	14-L2	no failure / interruption
	15-L3	no failure / interruption
	16-PEN	no failure / interruption
S5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S6	21-L1	no failure / interruption
	22-L2	no failure / interruption
	23-L3	no failure / interruption
	24-PEN	no failure / interruption
S7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption

Specimens 1, 2: cables (N)HXH 4x1,5 RE FE180 E90
Specimens 3, 4: cables (N)HXH 4x50 RM FE180 E90
Specimens 5, 6: cables (N)HXCH 4x1,5/1,5 RE FE180 E90
Specimens 7, 8: cables (N)HXCH 4x50/25 RM FE180 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 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	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption
S11	41-L1	69:37
	42-L2	x
	43-L3	x
	44-PEN	x
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

Specimens 9, 10: cables (N)HXCH 4x1,5/1,5 RE FE180 E90
Specimens 11, 12: cables (N)HXH 4x1,5 RE FE180 E90
Specimens 13, 14: cables (N)HXCH 4x1,5/1,5 RE FE180 E90
Specimens 15, 16: cables (N)HXH 4x1,5 RE FE180 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	no failure / interruption
	74-L2	no failure / interruption
	75-L3	no failure / interruption
	76-PEN	no failure / interruption
S20	77-L1	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
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

Specimens 17, 18: cable (N)HXH 4x1,5 RE FE180 E90
Specimens 19, 20: cables (N)HXH 4x50 RM FE180 E90
Specimens 21, 22: cables (N)HXH 4x1,5 RE FE180 E90
Specimens 23, 24: cables (N)HXH 4x50 RM FE180 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 S28

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	x
	102-L2	85:38
	103-L3	x
	104-PEN	x
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

Specimens 25, 26: cables (N)HXH 4x1,5 RE FE180 E90
Specimens 27, 28: cables (N)HXH 4x50 RM FE180 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 S52 to S59

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52	209-L	31:46
	210-PEN	x
	211-L	x
	212-PEN	x
S53	213-L	52:46
	214-PEN	x
	215-L	x
	216-PEN	x
S54	217-L	50:10
	218-PEN	x
	219-L	x
	220-PEN	x
S55	221-L	no failure / interruption
	222-PEN	no failure / interruption
	223-L	no failure / interruption
	224-PEN	no failure / interruption
S56	225-L	x
	226-PEN	x
	227-L	43:50
	228-PEN	x
S57	229-L	48:18
	230-PEN	x
	231-L	x
	232-PEN	x
S58	233-L	x
	234-PEN	x
	235-L	28:26
	236-PEN	x
S59	237-L	no failure / interruption
	238-PEN	no failure / interruption
	239-L	no failure / interruption
	240-PEN	no failure / interruption

Specimens 52, 53: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 54, 55: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
Specimens 56, 57: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 58, 59: cables JE-H(St)H 2x2x0,8 Bd FE180 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 / 0,03W. Circuit breakers with rating 3 A were used.

Measured time of tested specimens from S60 to S67

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S60	241-L	no failure / interruption
	242-PEN	no failure / interruption
	243-L	no failure / interruption
	244-PEN	no failure / interruption
S61	245-L	x
	246-PEN	x
	247-L	71:52
	248-PEN	x
S62	249-L	x
	250-PEN	x
	251-L	21:40
	252-PEN	x
S63	253-L	x
	254-PEN	x
	255-L	61:03
	256-PEN	x
S64	257-L	31:46
	258-PEN	x
	259-L	x
	260-PEN	x
S65	261-L	no failure / interruption
	262-PEN	no failure / interruption
	263-L	no failure / interruption
	264-PEN	no failure / interruption
S66	265-L	79:41
	266-PEN	x
	267-L	79:41
	268-PEN	x
S67	269-L	72:26
	270-PEN	x
	271-L	x
	272-PEN	x

Specimens 60, 61: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 62, 63: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
Specimens 64, 65: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 66, 67: cables JE-H(St)H 2x2x0,8 Bd FE180 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 / 0,03W. Circuit breakers with rating 3 A were used.

Measured time of tested specimens from S68 to S75

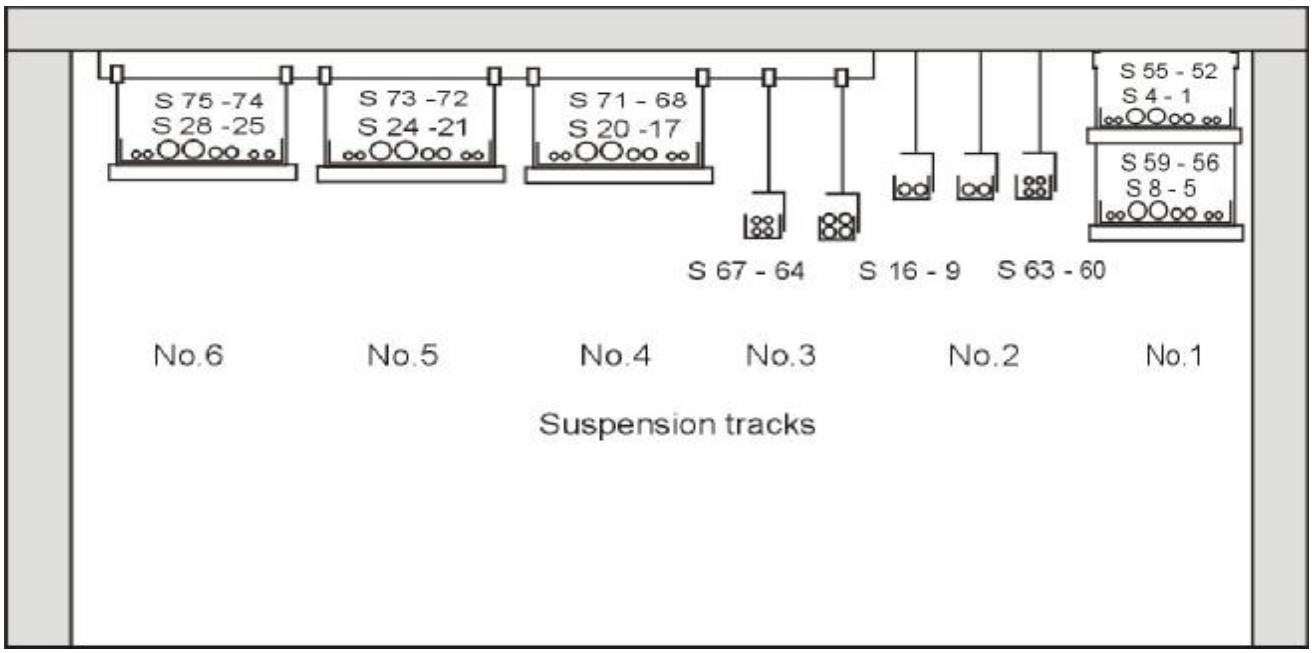
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S68	273-L	no failure / interruption
	274-PEN	no failure / interruption
	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69	277-L	no failure / interruption
	278-PEN	no failure / interruption
	279-L	no failure / interruption
	280-PEN	no failure / interruption
S70	281-L	62:41
	282-PEN	x
	283-L	x
	284-PEN	x
S71	285-L	71:12
	286-PEN	x
	287-L	x
	288-PEN	x
S72	289-L	x
	290-PEN	x
	291-L	49:02
	292-PEN	x
S73	293-L	no failure / interruption
	294-PEN	no failure / interruption
	295-L	no failure / interruption
	296-PEN	no failure / interruption
S74	297-L	x
	298-PEN	x
	299-L	36:14
	300-PEN	x
S75	301-L	60:02
	302-PEN	x
	303-L	60:02
	304-PEN	x

Specimens 68, 69: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 70, 71: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90
Specimens 72, 74: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90
Specimens 73, 75: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90

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

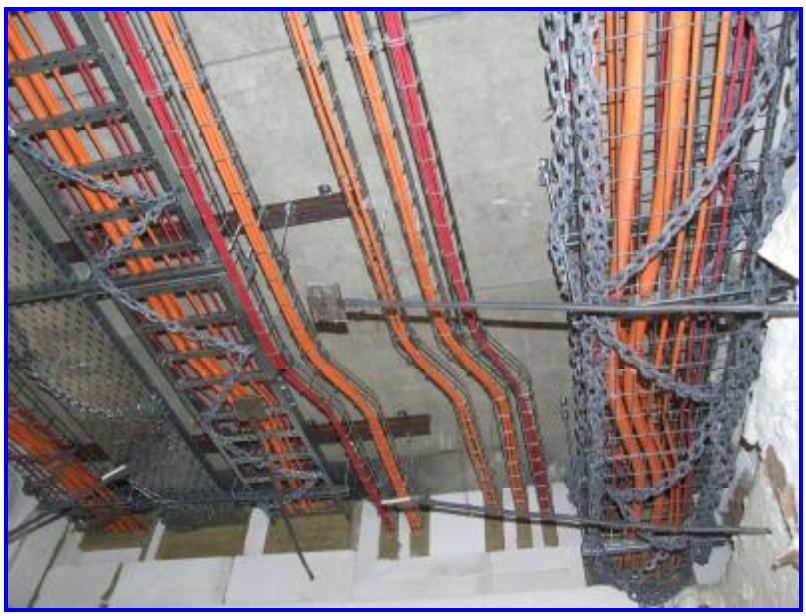
Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,03W. Circuit breakers with rating 3 A were used.

Layout of cables in the test furnace



Specimens 1, 2: cables (N)HXH 4x1,5 RE FE180 E90	Specimens placed in the mesh trays KDSO400H60/3 (BAKS). Suspension track No.1
Specimens 3, 4: cables (N)HXH 4x50 RM FE180 E90	
Specimens 5, 6: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	
Specimens 7, 8: cables (N)HXCH 4x50/25 RM FE180 E90	
Specimens 9, 10: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	Specimens placed in the mesh trays KDSO60H60/3 (BAKS). Suspension track No.2 and 3
Specimens 11, 12: cables (N)HXH 4x1,5 RE FE180 E90	
Specimens 13, 14: cables (N)HXCH 4x1,5/1,5 RE FE180 E90	
Specimens 15, 16: cables (N)HXH 4x1,5 RE FE180 E90	
Specimens 17, 18: cable (N)HXH 4x1,5 RE FE180 E90	Specimens placed on the ladder DGOP400H60/3 (BAKS). Suspension track No.4
Specimens 19, 20: cables (N)HXH 4x50 RM FE180 E90	
Specimens 21, 22: cables (N)HXH 4x1,5 RE FE180 E90	Specimens placed in the cable tray KCOP400H60/3 (BAKS). Suspension track No.5
Specimens 23, 24: cables (N)HXH 4x50 RM FE180 E90	
Specimens 25, 26: cables (N)HXH 4x1,5 RE FE180 E90	Specimens placed in the mesh tray KDSO400H60/3 (BAKS). Suspension track No.6
Specimens 27, 28: cables (N)HXH 4x50 RM FE180 E90	
Specimens 52, 53: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	Specimens placed in the mesh trays KDSO400H60/3 (BAKS). Suspension track No.1
Specimens 54, 55: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimens 56, 57: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	
Specimens 58, 59: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimens 60, 61: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	Specimens placed in the mesh trays KDSO60H60/3 (BAKS). Suspension track No.2 and 3
Specimens 62, 63: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimens 64, 65: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	
Specimens 66, 67: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimens 68, 69: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	Specimens placed on the ladder DGOP400H60/3 (BAKS). Suspension track No.4
Specimens 70, 71: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimen 72: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	Specimens placed in the cable tray KCOP400H60/3 (BAKS). Suspension track No.5
Specimen 73: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	
Specimen 74: cables JE-H(St)HRH 2x2x0,8 Bd FE180 E30-E90	Specimens placed in the mesh tray KDSO400H60/3 (BAKS). Suspension track No.6
Specimen 75: cables JE-H(St)H 2x2x0,8 Bd FE180 E30-E90	

Photos taken before the test



Photos taken after the termination of the test

pyrofil® Keram (N)HXH FE180 E90

Safety low voltage cable 0.6/1kV

Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

Dätwyler

Introduction
Safety cables
Support systems
Fixing devices
Firestop systems
Distribution boxes
Accessories

Product information

Application

Safety cables are used in all situations that require special protection against fire and flame damage for people and equipment and where a high degree of safety conditions must be fulfilled. Suitable for indoor applications. For outdoor applications, protection must be provided against exposure to direct sunlight. The cable should only be laid directly in earth or water if a protective conduit is used.
These cables correspond to the demands of circuit integrity E90 in accordance with DIN 4102-12.
Circuit integrity is guaranteed at an operating voltage up to 400V.
Permitted operating temperature at conductor +90°C.

Construction

Conductor	Bare copper, solid or stranded to IEC 60228, EN 60228, (VDE 0295)
Insulation	Double insulation, cross-linked, high-performance Keram special compound according to VDE 0266 "H01"
Filler	Flame retardant, halogenfree, thermoplastic compound
Outer sheath	Flame retardant, Polyolefin compound according to CENELEC HD 604 S1 and VDE 0276-604 "HM4"
Core colours	According to CENELEC HD 308 S2 and VDE 0293
Sheath colour	orange
Printing	DÄTWYLER PYROFIL KERAM (N)HXH FE180 E90 1kV "N X MM2" VDE REG. NR. 7780 "ORDER NO." "YEAR" "METRE MARKING"

Technical Properties

Nominal voltage	0.6/1kV
Test voltage	4000V, 50Hz
Operating Temperature	-5°C to +90°C

General Properties

Zero halogen non corrosive gases	IEC 60754-2, EN 50267, VDE 0482-267
Flame retardance	IEC 60332-1, (EN 50265-2-1) New: EN 60332-1, (VDE 0482-265-2-1), New: VDE 0482-332-1
Reduced fire propagation	IEC 60332-3 cat. C/A, EN 50266-2-4, VDE 0482-266-2-4
Minimum smoke emission	IEC 61034, (EN 50268), New: EN 61034, (VDE 0482-268), New: VDE 0482-1034
Insulation integrity FE180	IEC 60331, VDE 0472 part 814, EN 50200, VDE 0482-1
Circuit integrity E90	DIN 4102 part 12
Installation	Cables can be bundled, single clamp laying distance up to 600mm, Strap clamps without trough up to 800mm

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 05.09.2008
Podpis/Signature

Dokument č./Document No. FIRES-PE-061-08-NVČ
Príloha č./Appendix No. 13

Dätwyler

pyrofil® Keram (N)HXH FE180 E90

Safety low voltage cable 0.6/1kV
Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

Article No.	No. of cores x cross section		Cu content	Total weight	Outer diameter	Fire load
	n x mm²		kg/km	app. kg/km	app. mm	kWh/m
186 141	1 x 16	RM	154	243	10,2	0,35
186 142	1 x 25	RM	240	347	11,7	0,43
186 143	1 x 35	RM	336	449	12,8	0,49
186 144	1 x 50	RM	480	589	14,3	0,58
186 145	1 x 70	RM	672	810	16,1	0,67
186 146	1 x 95	RM	912	1090	18,5	0,85
186 147	1 x 120	RM	1152	1318	19,6	0,91
186 148	1 x 150	RM	1440	1648	21,8	1,11
186 149	1 x 185	RM	1776	2029	24,0	1,32
186 150	1 x 240	RM	2304	2658	27,2	1,63
186 151	1 x 300	RM	2880	3166	29,6	1,91
187 246	2 x 1,5	RE	29	178	11,0	0,48
187 247	2 x 2,5	RE	48	217	11,8	0,54
187 248	2 x 4	RE	77	272	12,8	0,62
187 249	2 x 6	RE	115	337	13,8	0,70
187 250	2 x 10	RE	192	459	15,4	0,83
187 254	2 x 16	RM	307	714	19,0	1,19
187 255	2 x 25	RM	480	1011	22,0	1,54
187 256	2 x 35	RM	672	1287	24,2	1,79
187 257	2 x 50	RM	960	1742	28,0	2,35
187 258	2 x 70	RM	1344	2346	31,6	2,86
187 259	2 x 95	RM	1824	3130	36,2	3,67
187 260	2 x 120	RM	2304	3729	38,6	4,11
186 174	3 x 1,5	RE	43	200	11,5	0,53
186 177	3 x 2,5	RE	72	250	12,4	0,60
186 182	3 x 4	RE	115	319	13,5	0,68
186 186	3 x 6	RE	173	403	14,6	0,77
186 189	3 x 10	RE	288	560	16,3	0,91
186 152	3 x 16	RM	461	878	20,2	1,29
186 153	3 x 25	RM	720	1299	24,0	1,75
186 154	3 x 35	RM	1008	1664	26,4	2,02
186 207	3 x 50	RM	1440	2189	29,8	2,51
187 261	3 x 70	RM	2016	2997	33,9	3,09
187 262	3 x 95	RM	2736	4007	38,9	3,95
187 263	3 x 120	RM	3456	4812	41,5	4,39
187 264	3 x 150	RM	4320	5988	46,0	5,32
187 265	3 x 185	RM	5328	7363	50,7	6,44
187 266	3 x 240	RM	6912	9632	57,6	8,10

Additional dimensions available on request.

Technical changes reserved.

pyrofil® Keram (N)HXH FE180 E90

Safety low voltage cable 0.6/1kV

Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 51
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

Dätwyler

Article No.	No. of cores x cross section	Cu content	Total weight	Outer diameter	Fire load
	n x mm²	kg/km	app. kg/km	app. mm	kWh/m
187 267	3 x 35 + 1 x 16 RM	1162	1833	27,4	2,13
187 268	3 x 50 + 1 x 25 RM	1680	2457	31,3	2,69
187 269	3 x 70 + 1 x 35 RM	2352	3362	35,6	3,34
187 270	3 x 95 + 1 x 50 RM	3216	4488	40,7	4,24
187 271	3 x 120 + 1 x 70 RM	4128	5532	44,0	4,82
187 272	3 x 150 + 1 x 70 RM	4992	6666	48,0	5,70
187 273	3 x 185 + 1 x 95 RM	6240	8315	53,4	7,00
186 175	4 x 1,5 RE	58	234	12,4	0,61
186 178	4 x 2,5 RE	96	296	13,4	0,69
186 183	4 x 4 RE	154	381	14,6	0,78
186 187	4 x 6 RE	230	490	15,8	0,90
186 190	4 x 10 RE	384	695	17,8	1,07
186 155	4 x 16 RM	614	1089	22,1	1,54
186 156	4 x 25 RM	960	1618	26,3	2,05
186 157	4 x 35 RM	1344	2083	29,0	2,36
186 158	4 x 50 RM	1920	2752	32,8	2,97
186 159	4 x 70 RM	2688	3804	37,6	3,55
186 160	4 x 95 RM	3648	5092	43,1	4,75
187 274	4 x 120 RM	4608	6133	46,0	5,27
186 161	4 x 150 RM	5760	7662	51,2	6,49
187 275	4 x 185 RM	7104	9425	56,5	7,85
187 276	4 x 240 RM	9216	12334	64,1	9,85

Additional dimensions available on request.

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Príloha č./Appendix No. 15

Dätwyler

pyrofil® Keram (N)HXH FE180 E90

Safety low voltage cable 0.6/1kV

Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

Article No.	No. of cores x cross section			Cu content	Total weight	Outer diameter	Fire load
	n x mm²			kg/km	app. kg/km	app. mm	kWh/m
186 176	5	x 1,5	RE	72	278	13,4	0,71
186 179	5	x 2,5	RE	120	353	14,5	0,81
186 184	5	x 4	RE	192	456	15,8	0,93
186 188	5	x 6	RE	288	589	17,2	1,05
186 191	5	x 10	RE	480	832	19,3	1,25
186 162	5	x 16	RM	768	1361	24,8	1,86
186 163	5	x 25	RM	1200	1960	28,8	2,42
186 164	5	x 35	RM	1680	2547	32,0	2,86
186 165	5	x 50	RM	2400	3392	36,5	3,68
187 277	5	x 70	RM	3360	4667	41,5	4,51
185 271	7	x 1,5	RE	101	331	14,4	0,81
186 180	7	x 2,5	RE	168	426	15,6	0,92
186 185	7	x 4	RE	269	563	17,1	1,05
172 260	10	x 1,5	RE	144	457	17,8	1,09
187 253	10	x 2,5	RE	240	593	19,4	1,24
185 272	12	x 1,5	RE	173	513	18,3	1,20
186 181	12	x 2,5	RE	288	675	20,0	1,37
185 273	24	x 1,5	RE	346	901	24,6	1,99

Additional dimensions available on request.

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FIRE RESISTANCE

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Príloha č./Appendix No. 16

Technical changes reserved.

pyrofil® Keram (N)HXCH FE180 E90

Safety low voltage cable 0.6/1kV
Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

Dätwyler

Product information

Application

Safety cables are used in all situations that require special protection against fire and flame damage for people and equipment and where a high degree of safety conditions must be fulfilled. Suitable for indoor applications. For outdoor applications, protection must be provided against exposure to direct sunlight. The cable should only be laid directly in earth or water if a protective conduit is used.
These cables correspond to the demands of circuit integrity E90 in accordance with DIN 4102-12.
Circuit integrity is guaranteed at an operating voltage up to 400V.
Permitted operating temperature at conductor +90°C.

Construction

Conductor	Bare copper, solid or stranded to IEC 60228, EN 60228, (VDE 0295)
Insulation	Double insulation, cross-linked, high-performance Keram special compound according to VDE 0266 "HXI1"
Filler	Halogenfree, compound or plastic tape
Concentric conductor	Bare copper wires with reinforced helix
Separator	Plastic tape
Outer sheath	Polyolefin compound in according to CENELEC HD 604 S1 and VDE 0276-604 "HM4"
Core colours	According to CENELEC HD 308 S2 and VDE 0293
Sheath colour	orange
Printing	DÄTWYLER PYROFIL KERAM (N)HXCH FE180 E90 1kV "N X MM²" VDE REG. NR. 7780 "ORDER NO." "YEAR" "METRE MARKING"

Technical Properties

Nominal voltage	0.6/1kV
Test voltage	4000V, 50Hz
Operating Temperature	-5°C to +90°C

General Properties

Zero halogen non corrosive gases	IEC 60754-2, EN 50267, VDE 0482-267
Flame retardance	IEC 60332-1, (EN 50265-2-1) New: EN 60332-1, (VDE 0482-265-2-1), New: VDE 0482-332-1
Reduced fire propagation	IEC 60332-3 cat. C/A, EN 50266-2-4, VDE 0482-266-2-4
Minimum smoke emission	IEC 61034, (EN 50268), New: EN 61034, (VDE 0482-268), New: VDE 0482-1034
Insulation integrity FE180	IEC 60331, VDE 0472 part 814, EN 50200, VDE 0482-1
Circuit integrity E90	DIN 4102 part 12
Installation	Cables can be bundled, single clamp laying distance up to 600 mm. Strap clamps without trough up to 800mm

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FIRE RESISTANCE

Dátum/Date 03.05.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-061-08-ANNEX

Príloha č./Appendix No. 19

Technical changes reserved.

Dätwyler

pyrofil® Keram (N)HXCH FE180 E90

Safety low voltage cable 0.6/1kV
Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

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FIRE RESISTANCE

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Podpis/Signature

Dokument č./Document No. FIRES-FR-061-08-NVC

Príloha č./Appendix No. 18

Article No.	No. of cores x cross section		Cu content	Total weight	Outer diameter	Fire load
	n x mm²		kg/km	app. kg/km	app. mm	kWh/m
186 071	3 x 1,5	RE/1,5	66	248	13,2	0,65
186 195	3 x 2,5	RE/2,5	104	308	14,1	0,72
186 197	3 x 4	RE/4	161	404	15,7	0,84
187 278	3 x 6	RE/6	240	504	16,8	0,94
187 279	3 x 10	RE/10	408	727	18,6	1,15
187 251	3 x 16	RM/16	643	1166	24,4	1,64
187 406	3 x 25	RM/16	902	1496	25,8	1,95
172 417	3 x 35	RM/16	1190	1820	28,2	2,25
187 408	3 x 50	RM/25	1723	2493	32,5	2,90
187 409	3 x 70	RM/35	2410	3350	36,1	3,42
187 410	3 x 95	RM/50	3296	4570	42,0	4,50
187 411	3 x 120	RM/70	4236	5620	45,4	5,02
187 412	3 x 150	RM/70	5100	6850	50,7	6,00
187 413	3 x 185	RM/95	6383	8350	55,0	7,10
187 414	3 x 240	RM/120	8242	11100	62,1	9,08
186 072	4 x 1,5	RE/1,5	81	286	14,1	0,73
186 196	4 x 2,5	RE/2,5	128	358	15,1	0,82
186 198	4 x 4	RE/4	200	473	16,8	0,96
186 199	4 x 6	RE/6	297	621	18,1	1,13
186 200	4 x 10	RE/10	504	868	20,1	1,33
186 131	4 x 16	RM/16	796	1400	25,3	1,81
186 132	4 x 25	RM/16	1142	1895	28,9	2,28
186 133	4 x 35	RM/16	1526	2376	31,6	2,60
186 134	4 x 50	RM/25	2203	3249	36,7	3,49
186 135	4 x 70	RM/35	3082	4426	41,3	4,25
186 136	4 x 95	RM/50	4208	5809	46,4	5,53
186 137	4 x 120	RM/70	5388	7134	50,1	6,25
186 138	4 x 150	RM/70	6540	8703	55,3	7,58
186 139	4 x 185	RM/95	8159	10827	60,8	9,18
186 140	4 x 240	RM/120	10546	14139	69,2	11,60
186 073	7 x 1,5	RE/2,5	133	393	16,1	0,94
187 280	7 x 2,5	RE/2,5	200	491	17,3	1,05
187 415	12 x 1,5	RE/2,5	205	595	20,2	1,38
172 454	12 x 2,5	RE/4	334	798	22,6	1,63
187 402	24 x 1,5	RE/6	413	901	27,4	2,32
187 403	24 x 2,5	RE/10	696	1205	30,6	2,69
187 404	30 x 1,5	RE/6	499	1252	29,1	2,67
187 405	30 x 2,5	RE/10	840	1692	32,2	3,11

Additional dimensions available on request.

Technical changes reserved.

Dätwyler

pyrofil® Keram (N)HXCH FE180 E90

Safety low voltage cable 0.6/1kV
Halogen-free, with improved fire characteristics
With reference to VDE 0266 and CENELEC HD 604 S1
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331
Circuit integrity E90 in accordance with DIN 4102-12

FIRES s.r.o.
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FIRE RESISTANCE

Dátum/Date 03.09.2008
Podpis/Signature

Dokument č./Document No. FIRES-FR-001-08-NNVE

Príloha č./Appendix No. 99

Article No.	No. of cores x cross section		Cu content	Total weight	Outer diameter	Fire load
	n x mm²		kg/km	app. kg/km	app. mm	kWh/m
186 071	3 x 1,5	RE/1,5	66	248	13,2	0,65
186 195	3 x 2,5	RE/2,5	104	308	14,1	0,72
186 197	3 x 4	RE/4	161	404	15,7	0,84
187 278	3 x 6	RE/6	240	504	16,8	0,94
187 279	3 x 10	RE/10	408	727	18,6	1,15
187 251	3 x 16	RM/16	643	1166	24,4	1,64
187 406	3 x 25	RM/16	902	1496	25,8	1,95
172 417	3 x 35	RM/16	1190	1820	28,2	2,25
187 408	3 x 50	RM/25	1723	2493	32,5	2,90
187 409	3 x 70	RM/35	2410	3350	36,1	3,42
187 410	3 x 95	RM/50	3296	4570	42,0	4,50
187 411	3 x 120	RM/70	4236	5620	45,4	5,02
187 412	3 x 150	RM/70	5100	6850	50,7	6,00
187 413	3 x 185	RM/95	6383	8350	55,0	7,10
187 414	3 x 240	RM/120	8242	11100	62,1	9,08
186 072	4 x 1,5	RE/1,5	81	286	14,1	0,73
186 196	4 x 2,5	RE/2,5	128	358	15,1	0,82
186 198	4 x 4	RE/4	200	473	16,8	0,96
186 199	4 x 6	RE/6	297	621	18,1	1,13
186 200	4 x 10	RE/10	504	868	20,1	1,33
186 131	4 x 16	RM/16	796	1400	25,3	1,81
186 132	4 x 25	RM/16	1142	1895	28,9	2,28
186 133	4 x 35	RM/16	1526	2376	31,6	2,60
186 134	4 x 50	RM/25	2203	3249	36,7	3,49
186 135	4 x 70	RM/35	3082	4426	41,3	4,25
186 136	4 x 95	RM/50	4208	5809	46,4	5,53
186 137	4 x 120	RM/70	5388	7134	50,1	6,25
186 138	4 x 150	RM/70	6540	8703	55,3	7,58
186 139	4 x 185	RM/95	8159	10827	60,8	9,18
186 140	4 x 240	RM/120	10546	14139	69,2	11,60
186 073	7 x 1,5	RE/2,5	133	393	16,1	0,94
187 280	7 x 2,5	RE/2,5	200	491	17,3	1,05
187 415	12 x 1,5	RE/2,5	205	595	20,2	1,38
172 454	12 x 2,5	RE/4	334	798	22,6	1,63
187 402	24 x 1,5	RE/6	413	901	27,4	2,32
187 403	24 x 2,5	RE/10	696	1205	30,6	2,69
187 404	30 x 1,5	RE/6	499	1252	29,1	2,67
187 405	30 x 2,5	RE/10	840	1692	32,2	3,11

Additional dimensions available on request.

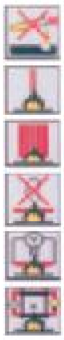
Technical changes reserved.

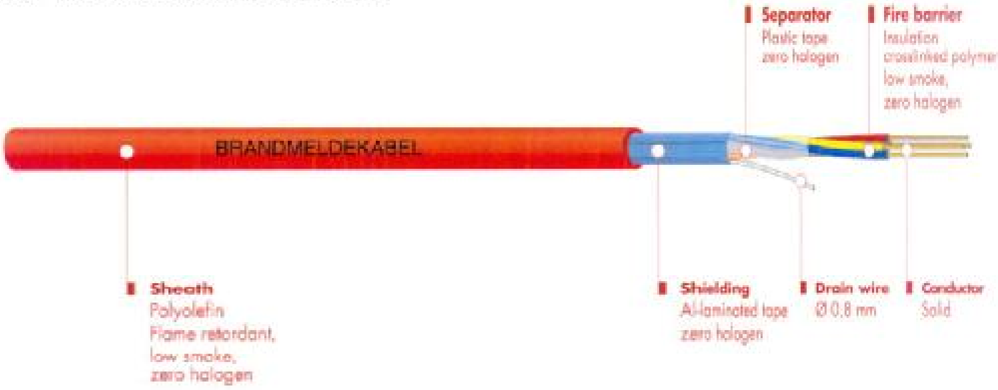
pyrofil® Keram JE-H(St)H...Bd FE180 E30-E90

Dätwyler

Fire alarm cable max. 225V

Halogen-free, with improved fire characteristics
with reference to VDE 0815
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331, EN 50200
Circuit integrity E30-E90* in accordance with DIN 4102-12





Product information

Application

Safety cables are used in all situations that require special protection against fire and flame damage for people and equipment and where a high degree of safety conditions must be fulfilled. Suitable for indoor applications. For outdoor applications, protection must be provided against exposure to direct sunlight. The cable should only be laid directly in earth or water if a protective conduit is used. These cables correspond to the demands of circuit integrity E90 in accordance with DIN 4102-12. Circuit integrity is guaranteed at an operating voltage up to 110V.
Permitted operating temperature at conductor +90°C.

Construction

Conductor	Bare copper, solid, 0.8mm diameter, according to VDE 0815
Insulation	Fire-resistant, crosslinked, high-performance Keram special-compound in accordance with VDE 0266 „HXI 1"
Separator	PEPT "Plastic Tape"
Shielding	Al-laminated tape with tinned copper drain wire Ø 0.8mm
Outer sheath	Flame retardent polyolefin compound according to VDE 0819 part 107, EN 50290-2-27 and VDE 0250-214 „HM 2"'
Printing	DÄTWYLER PYROFIL KERAM „BRANDMELDEKABEL" JE-H(ST)H...BD FE180 E30-E90 „N X 2 X MM" VDE REG. NO.9361 „ORDER NO." „METRE MARKING"

Technical Properties

Insulation resistance	min. 100 MΩ x km
Loop resistance	max. 73.2 Ω/km at 0.80 mm
Capacitance unbalance	max. 120 nF/km bei 800 Hz
Kapazitive Kopplung	K max. 200 pF/100m at 800 Hz
Rated volage	max. 225 V
Test voltage	500 V, 50 Hz Core/Core 2000 V, 50Hz, Core/Screen
Operating temperature	fixes state -30°C to +70°C mobile state -5°C to +50°C

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Příloha č./Appendix No. 20

General Properties

Core colours	According to VDE 0815, bundles identified by numbered tape
Sheath colour	red
Zero halogen non corrosive gases	IEC 60754-2, EN 50267, VDE 0482-267
Flame retardance	IEC 60332-1, (EN 50265-2-1) New: EN 60332-1, (VDE 0482-265-2-1), New: VDE 0482-332-1
Reduced fire propagation	IEC 60332-3 cat. C/A, EN 50266-2-4, VDE 0482-266-2-4
Minimum smoke emission	IEC 61034, (EN 50268), New: EN 61034, (VDE 0482-268), New: VDE 0482-1034
Insulation integrity FE180	IEC 60331, VDE 0472 part 814, EN 50200, VDE 0482-1
Circuit integrity E30-E90*	DIN 4102 part 12, NBN 713.020 (Rf 1½)
Installation	Cables can be bundled, single clamp laying up to 600 mm, Strap clamps without trough up to 800 mm

* Circuit integrity is dependent on installation method

Technical changes reserved.

Dätwyler

pyrofil® Keram JE-H(St)H...Bd FE180 E30-E90

Wiring cable for industry electronics max. 225V

Halogen-free, with improved fire characteristics
with reference to VDE 0815
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331, EN 50200
Circuit integrity E30-E90* in accordance with DIN 4102-12

Article No.	No. of cores x cross section					Cu content	Total weight	Outer diameter	Fire load
	n x mm					kg/km	app. kg/km	app. mm	kWh/m
188 092	1	x	2	x	0.80	15	40	5.5	0.095
188 097	2	x	2	x	0.80	25	56	6.0	0.123
188 099	4	x	2	x	0.80	45	96	8.7	0.21
188 102	8	x	2	x	0.80	85	218	13.7	0.52
188 104	12	x	2	x	0.80	126	270	14.6	0.58
188 106	16	x	2	x	0.80	166	337	16.0	0.69
188 108	20	x	2	x	0.80	206	403	18.0	0.80
188 111	32	x	2	x	0.80	326	570	21.8	1.02
188 113	40	x	2	x	0.80	407	739	25.3	1.38
188 115	52	x	2	x	0.80	529	906	27.6	1.59

Additional dimensions available on request.

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POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 03. 09. 2008
Podpis/Signature

Dokument č./Document No. FIRES-PR-069-08-Aw4

Príloha č./Appendix No. 21

Technical changes reserved.

pyrofil® Keram JE-H(St)HRH...Bd FE180 E30-E90

Fire alarm cable with steel wire braiding max. 225V

Halogen-free, with improved fire characteristics
with reference to VDE 0815
Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331, EN 50200
Circuit integrity E30-E90* in accordance with DIN 4102-12

Dätwyler

Product information

Application

Safety cables are used in all situations that require special protection against fire and flame damage for people and equipment and where a high degree of safety conditions must be fulfilled. Suitable for indoor applications. For outdoor applications, protection must be provided against exposure to direct sunlight. The fire alarm cables correspond to the demands of circuit integrity E30-E90* in accordance with DIN 4102-12. Circuit integrity is guaranteed at an operating voltage up to 110V.
The steel wire braiding serves as a form of mechanical protection.
Permitted operating temperature at conductor of +70°C.

Construction

Conductor	Bare copper, solid, 0.8mm diameter, according to VDE 0815
Insulation	Fire-resistant, crosslinked, high-performance Keram special-compound in accordance with VDE 0266 „HXI 1"
Separator	PEPT "Plastic Tape"
Shielding	Al-laminated tape with tinned copper drain wire Ø 0.8mm
Inner sheath	Flame retardant polyolefin compound according to VDE 0819 part 107, EN 50290-2-27 and VDE 0250-214 „HM2"
Armouring	Galvanised steel wire braid
Outer sheath	Flame retardent polyolefin compound according to VDE 0819 part 107, EN 50290-2-27 and VDE 0250-214 „HM 2"
Printing	DÄTWYLER PYROFIL KERAM „BRANDMELDEKABEL" JE-H(ST)HRH...BD FE180 E30-E90 „N X 2 X MM" „ORDER NO." „METRE MARKING"

Technical Properties

Insulation resistance	min. 100 MΩ x km
Loop resistance	max. 73.2 Ω/km at 0.80 mm
Capacitance unbalance	max. 120 nF/km bei 800 Hz
Kapazitive Kopplung	K max. 200 pF/100m at 800 Hz
Rated volage	max. 225 V
Test voltage	500 V, 50 Hz Core/Core 2000 V, 50Hz, Core/Screen
Operating temperature	fixes state -30°C to +70°C mobile state -5°C to +50°C

General Properties

Zero halogen non corrosive gases	IEC 60754-2, EN 50267, VDE 0482-267
Flame retardance	IEC 60332-1, (EN 50265-2-1) New: EN 60332-1, (VDE 0482-265-2-1), New: VDE 0482-332-1
Reduced fire propagation	IEC 60332-3 cat. C/A, EN 50266-2-4, VDE 0482-266-2-4
Minimum smoke emission	IEC 61034, (EN 50268), New: EN 61034, (VDE 0482-268), New: VDE 0482-1034
Insulation integrity FE180	IEC 60331, VDE 0472 part 814, EN 50200, VDE 0482-1
Circuit integrity E30-E90*	DIN 4102 part 12
Installation	Cables can be bundled, single clamp laying up to 600 mm. Strap clamps without trough up to 800 mm

* Circuit integrity is dependent on installation method.

Dätwyler

pyrofil® Keram JE-H(St)HRH...Bd FE180 E30-E90

Fire alarm cable with steel wire braiding max. 225V

Halogen-free, with improved fire characteristics
with reference to VDE 0815

Insulation integrity FE180 in accordance with VDE 0472-814, IEC 60331, EN 50200

Circuit integrity E30-E90* in accordance with DIN 4102-12

Article No.	No. of cores x cross section	Cu content	Total weight	Outer diameter	Fire load
	n x mm	kg/km	app. kg/km	app. mm	kWh/m
	1 x 2 x 0.80	15	94	8.3	0.23
188 119	2 x 2 x 0.80	25	117	9.0	0.26
188 120	4 x 2 x 0.80	45	179	11.7	0.39
188 127	8 x 2 x 0.80	85	404	18.0	0.93
188 128	12 x 2 x 0.80	126	466	18.9	1.01
	16 x 2 x 0.80	166	550	20.3	1.16
188 129	20 x 2 x 0.80	206	640	22.3	1.32
188 346	32 x 2 x 0.80	326	877	26.5	1.72
188 347	40 x 2 x 0.80	407	1118	30.4	2.28
188 348	52 x 2 x 0.80	529	1318	32.7	2.57

Additional dimensions available on request.

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

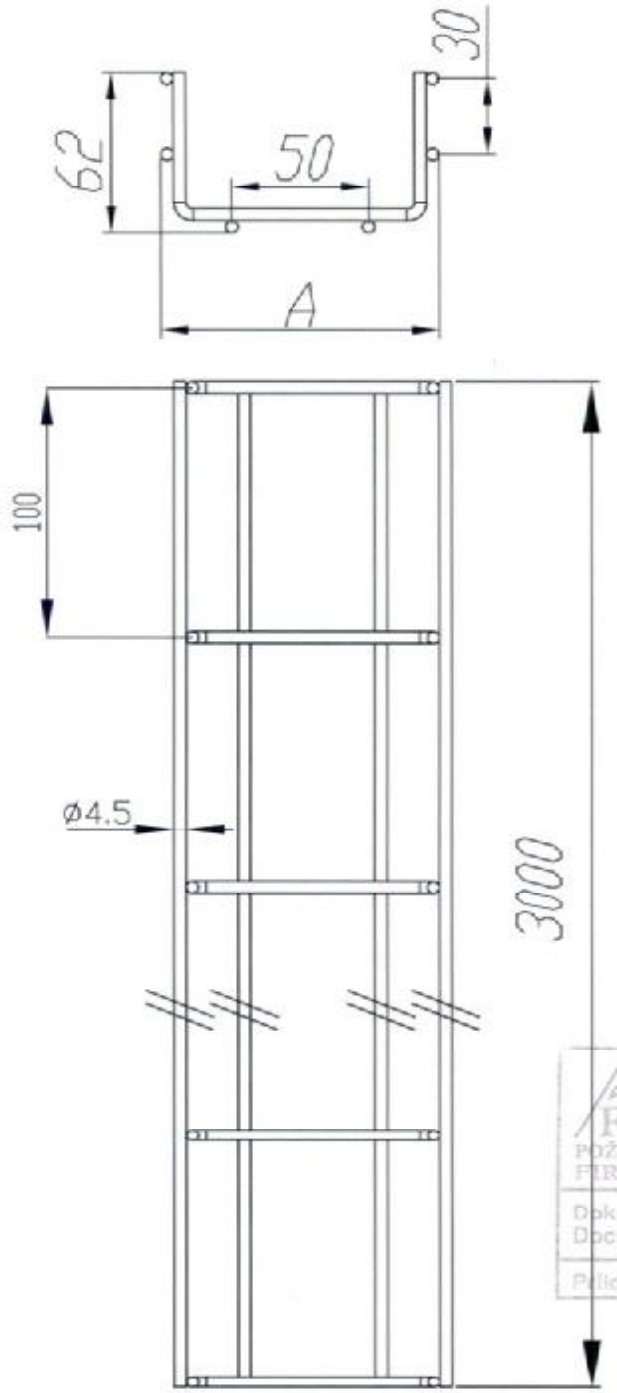
Dátum/Date 03.09.2008

Podpis/Signature

Dokument č./Document No. FIRES-FR-067-08-ANJE

Príloha č./Appendix No. 93

Technical changes reserved.



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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FIRE RESISTANCE

Dátum/Date 05.05.2008

Podpis/Signature

Dokument č./Document No. FIRES-FR-061-08-ANNEX

Príloha č./Appendix No. 24

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

	Nazwisko	Podpis	Data
Projektował			
Rysował	J.Rudak		18-01-08
Sprawdził	J.Kliczek		18-01-08
Zatwierdził	J.Kliczek		18-01-08

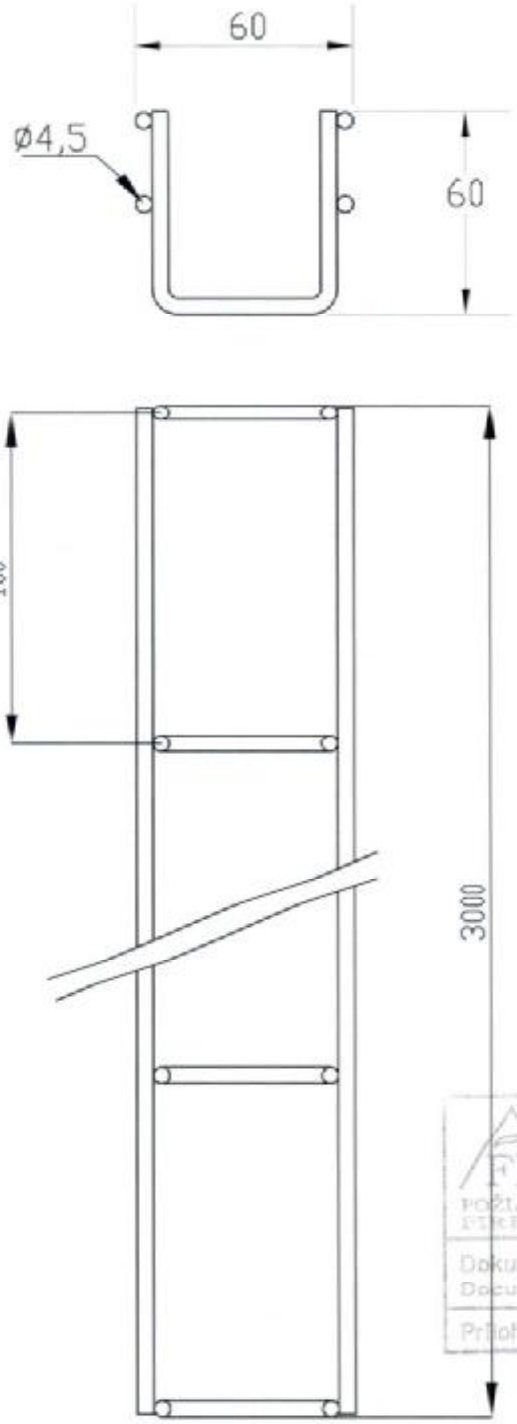
Nazwa rysunku: Korytko siatkowe KDS□ 100÷400H60

Nr programu maszynowego: ---

Nr zmiany

Nr rysunku

Profesjonalne Systemy Tras Kablowych



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FIRE RESISTANCE

Dátum/Date 03.04.2008
Podpis/Signature

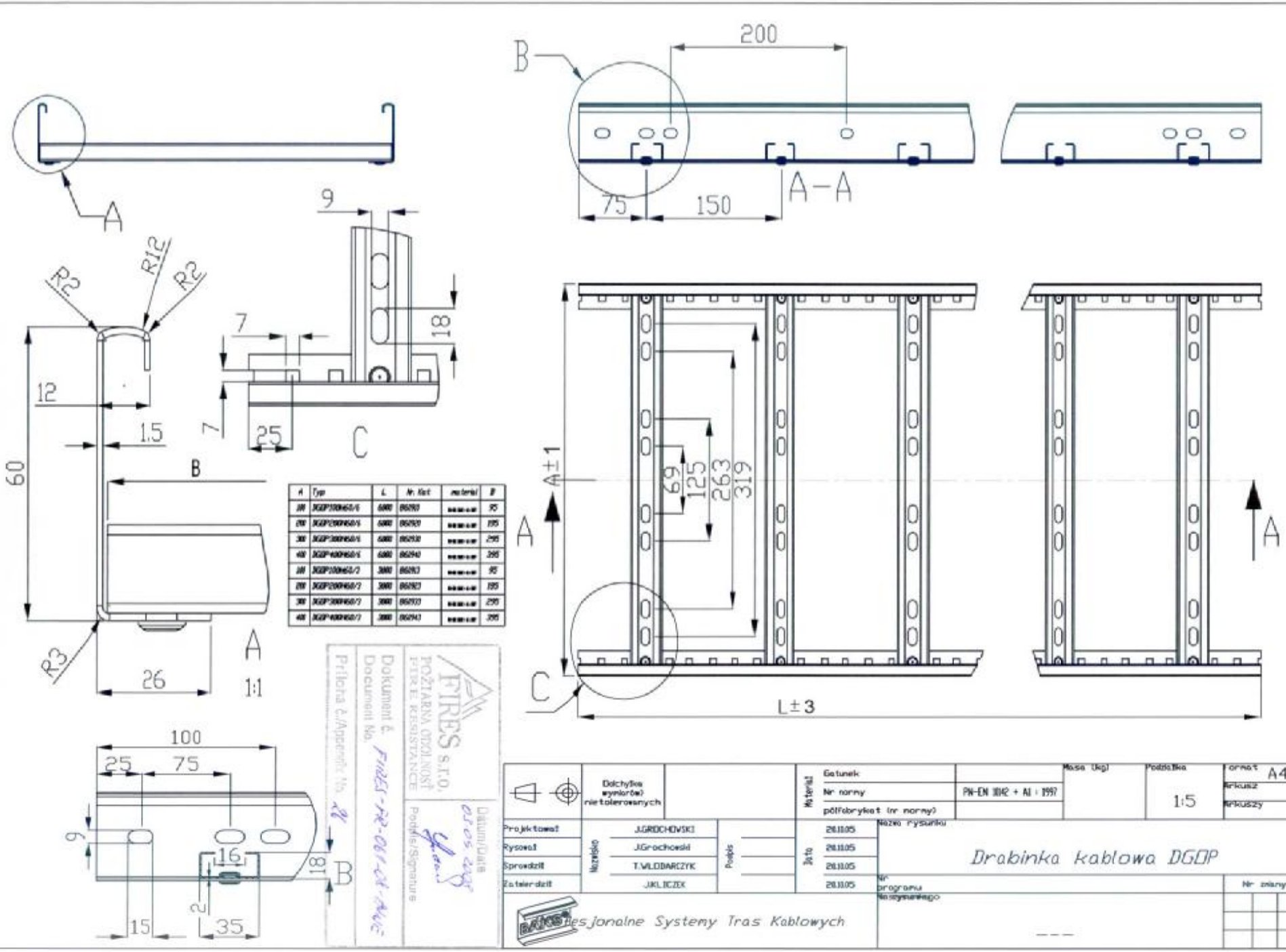
Dokument č. / Document No. FIRES-FR-061-04-ANNEX

Príloha č./Appendix No. 25

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

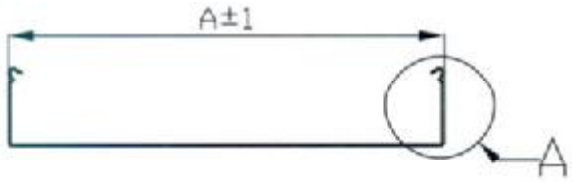
Projektował	T.Grudniewski		03.17.04	Nazwa rysunku	KDSO60H60	
Rysował	T.Grudniewski		03.17.04			
Sprawdził	J.Kliczek		03.17.04			
Zatwierdził	J.Kliczek		03.17.04	Nr programu maszynowego	---	Nr zmiany
				Nr rysunku		

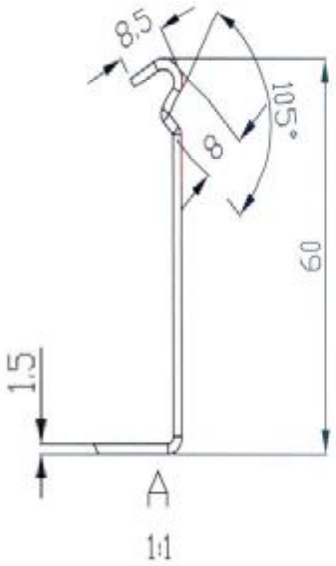
Profesjonalne Systemy
Tras Kablowych



A	Typ	L	Nr Kat	materiał	B
100	DGDP100H60/6	6000	862930		95
200	DGDP200H60/6	6000	862931		195
300	DGDP300H60/6	6000	862932		295
400	DGDP400H60/6	6000	862940		395
100	DGDP100H60/3	3000	862933		95
200	DGDP200H60/3	3000	862933		195
300	DGDP300H60/3	3000	862933		295
400	DGDP400H60/3	3000	862943		395

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





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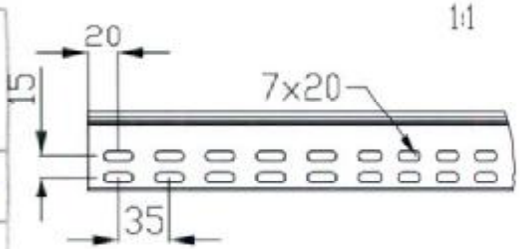
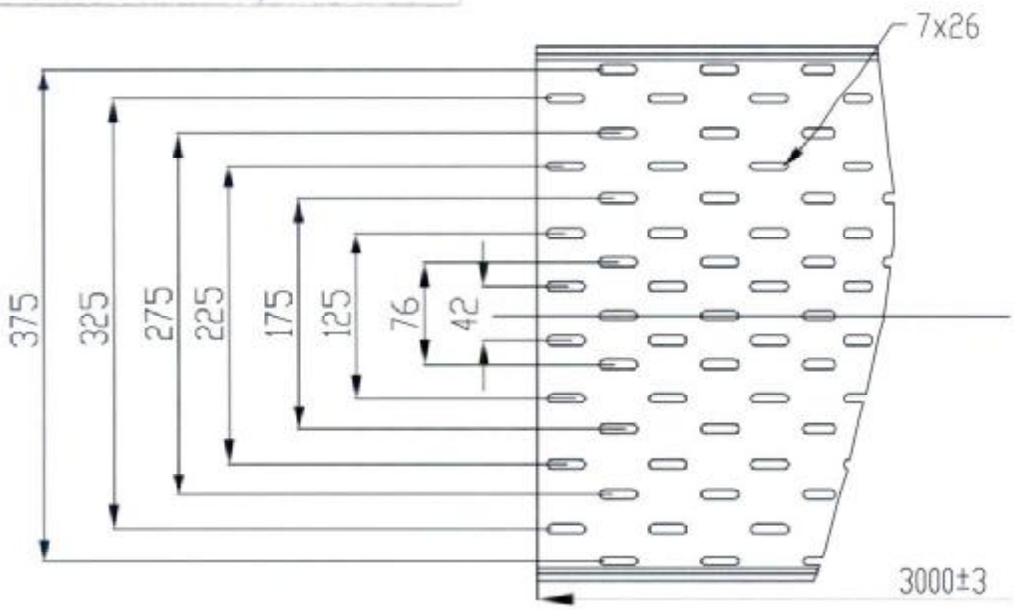
FIRE RESISTANCE

Dátum/Date 03.05.2006
Podpis/Signature

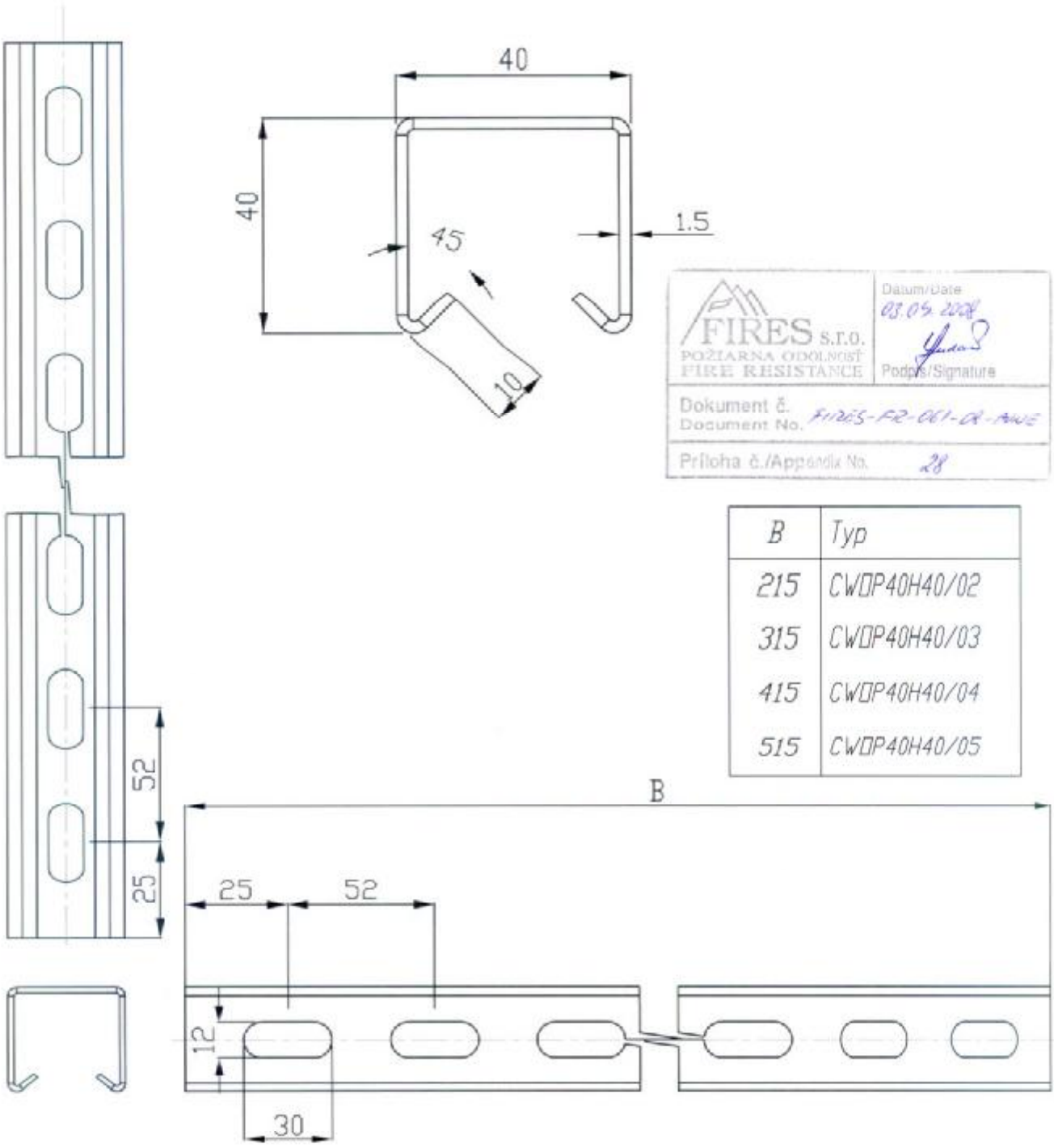
Dokument č./Document No. FIRES-FR-081-08-AUVE

Príloha č./Appendix No. 29





	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10142 + A1 : 1997			Arkuszy
				półfabrykat (nr normy)				Arkusz
Projektował	Nazwiska	J.GROCHOWSKI	Podpis	Data	20.10.05	Nazwa rysunku	KCOP400H60/3N	
Rysował		J.Grochowski			20.10.05			
Sprawdził		T.WŁODARCZYK			20.10.05			
Zatwierdził		J.KLICZEK			20.10.05	Nr programu maszynowego		Nr zmiany
Profesjonalne Systemy Tras Kablowych						Nr rysunku	862040	



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FIRE RESISTANCE

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Dokument č./Document No. FIRES-FR-061-08-ANNEX

Príloha č./Appendix No. 28

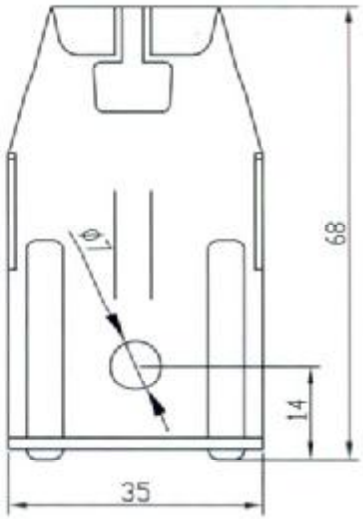
B	Typ
215	CW□P40H40/02
315	CW□P40H40/03
415	CW□P40H40/04
515	CW□P40H40/05

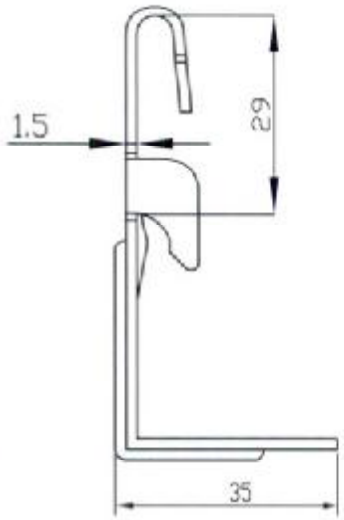
Odchylka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka 1:2	Format A4
			Nr normy	PN-EN 10327:2005			Arkusz
			półfabrykat (nr normy)				Arkuszy

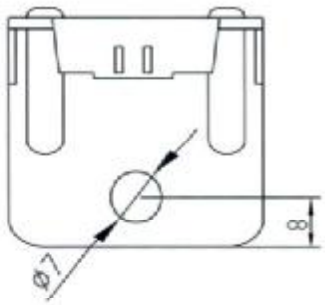
	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	J.GRODCHOWSKI		20.10.05	CW□P40H40/...
Rysował	J.Grochowski		20.10.05	
Sprawdził	T.WŁODARCZYK		20.10.05	
Zatwierdził	J.KLICZEK		20.10.05	Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku







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Dátum/Date 03.06.2008

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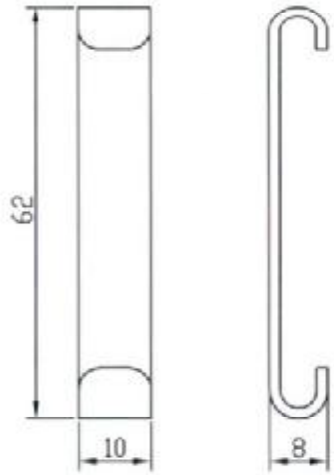
Príloha č./Appendix No. 29

	Odchyłka 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	Nazwa rysunku	WIESZAK KORYTKA SIATKOWEGO WKS060
Rysował					
Sprawdził					
Zatwierdził				Nr programu maszynowego ---	Nr zmiany
				Nr rysunku	

Profesjonalne Systemy Tras Kablowych



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Dátum/Date 03.04.2008

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Dokument č./Document No. FIRES-FR-061-08-ANNE

Príloha č./Appendix No. 30

	Odchyłka wymiarów nietolerowanych	Materiał	Gatunek	St3S	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 10.12.2007	Nazwa rysunku	
Rysował				SPINKA KORYTKA SIATKOWEGO SPS060	
Sprawdził					
Zatwierdził				Nr programu maszynowego ---	Nr zmiany
				Nr rysunku	

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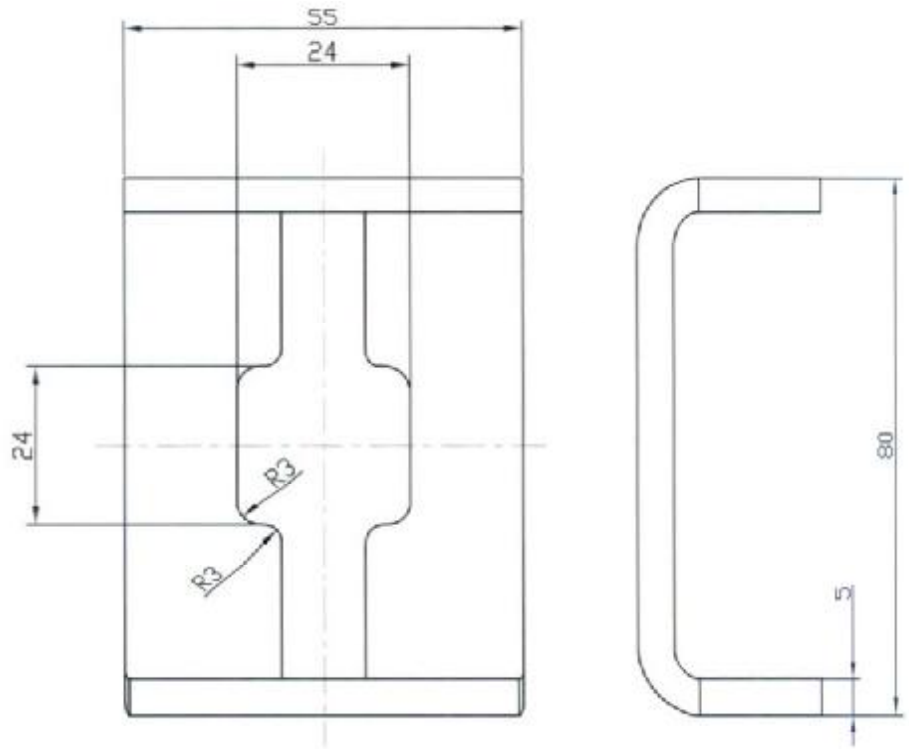

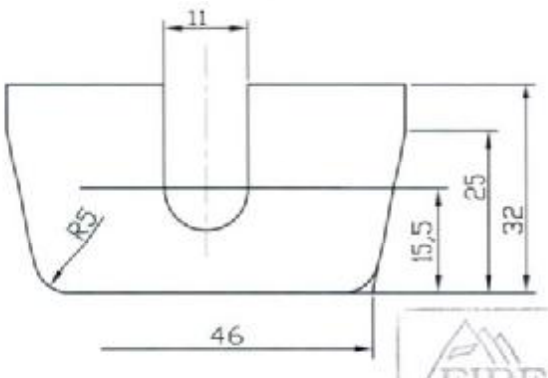

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Podpis/Signature

Dokument č. / Document No. FIRES-FR-061-08-PAVUC

Príloha č./Appendix No. 39

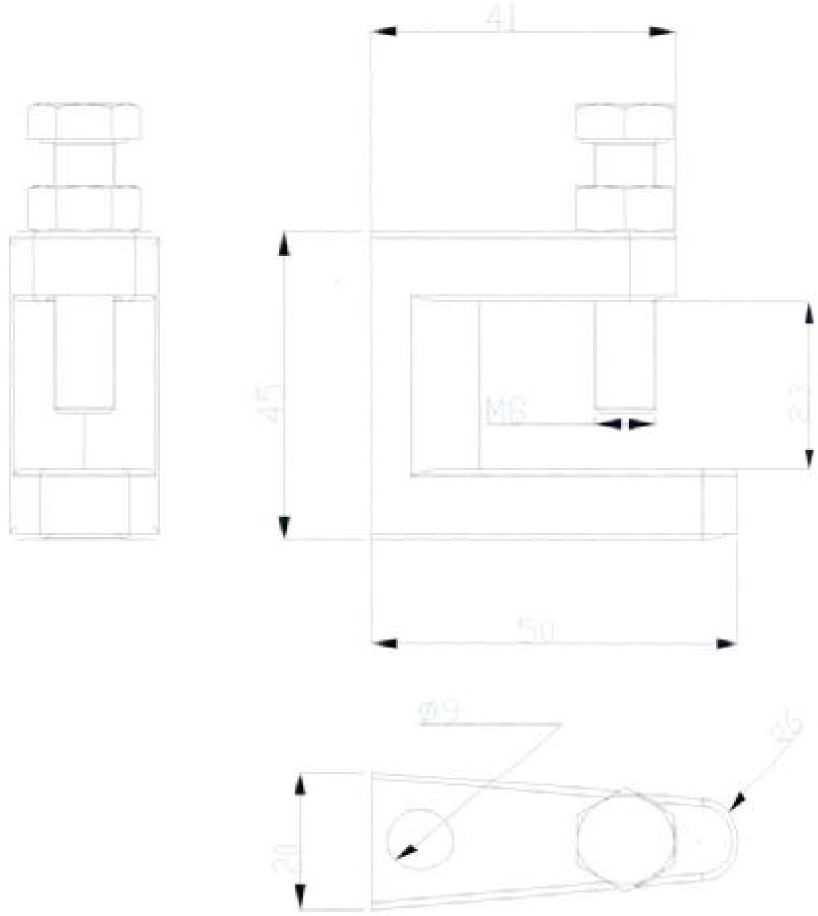
	Dachówka wyniki pomiarów nietolerowanych		Materiał	Gatunek	S235	Masa [kg]	Podziałka 1:1	Format A4
				Nr normy				Arkuszy 1
				półfabrykat (nr normy)				Arkuszy 1

	Nazwisko	Podpis	Data	Nazwa rysunku
Projektował	T.Grudniewski		2004.12.29	
Rysował	J.Jasiński		2004.12.29	USOV
Sprawdził	JKliczek		2004.12.29	
Zatwierdził	JKliczek		2004.12.29	Nr programu maszynowego ---

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku 803700



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FIRE RESISTANCE

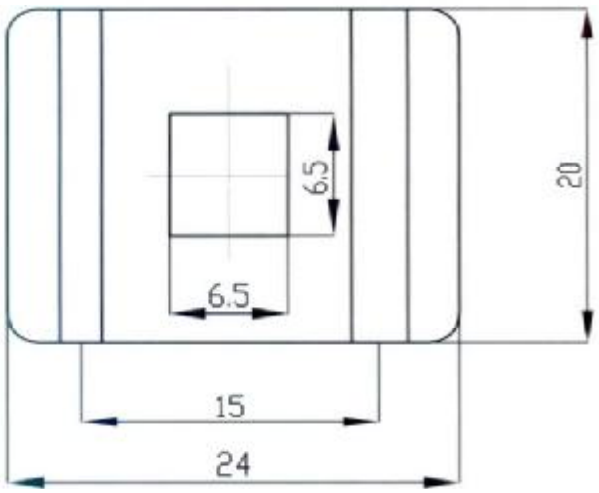
Dátum/Date 03. 04. 2008

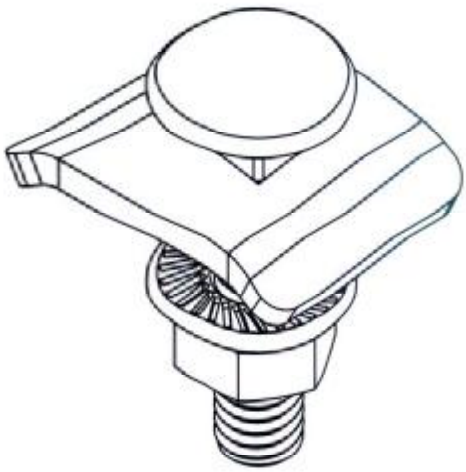
Podpis/Signature

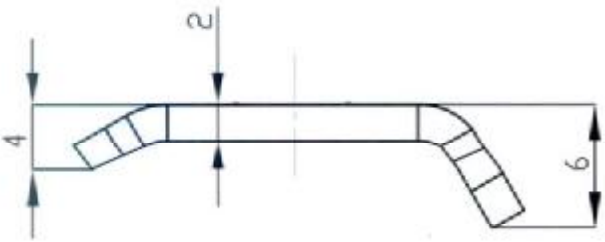
Dokument č.
Document No. FIRES-FR-061-08-AUVE

Príloha č./Appendix No. 32

Odchyłka wymiarów nietolerowanych		Materiał: Gatunek; Nr normy; półfabrykat (nr normy)	PN-EN 10327:2005	Masa (kg)	Podziałka 1:1	Format A4; Arkusz; Arkuszy
Projektował	Nazwisko	Podpis	Data	Nazwa rysunku
Rysował	J.Grochowski		05-Jul-06	ZACISK ZK
Sprawdził				
Zatwierdził				Nr programu maszynowego	Nr zmiany
Profesjonalne Systemy Tras Kablowych				Nr rysunku







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Dokument č. / Document No. FIRES-FR-061-08-ANNEX

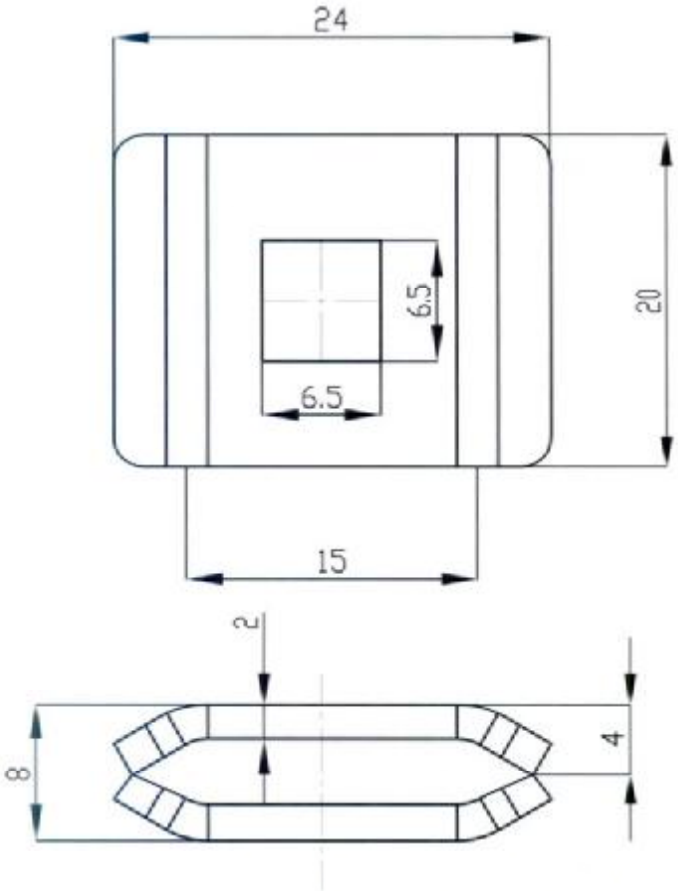
Príloha č./Appendix No. 35

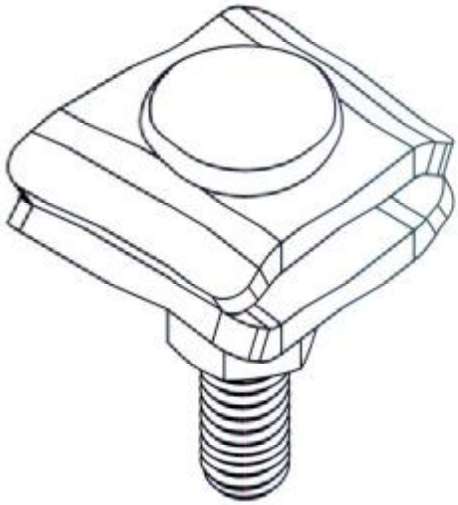
Odchyłka wymiarów nietolerowanych		Materiał: Gatunek		Masa [kg]	Podziałka	Format A4	
		Nr normy	PN-EN 10327:2005			Arkuszi	
		półfabrykat (nr normy)				Arkuszy	

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

Profesjonalne Systemy Tras Kablowych

Nr rysunku: 8





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Podpis/Signature

Dokument č./Document No. FIRES-FR-061-08-ANNEX

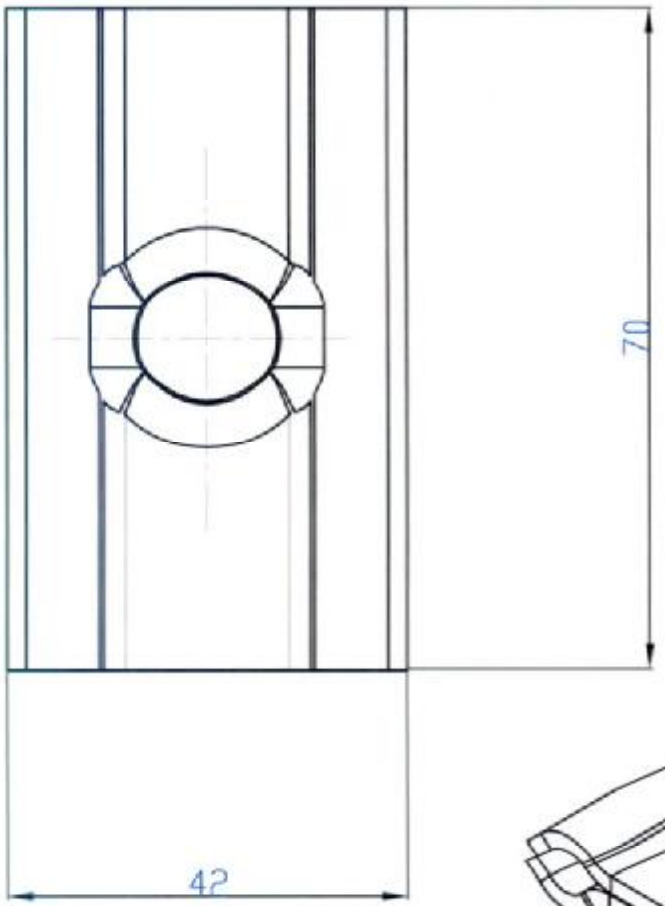
Príloha č./Appendix No. 39

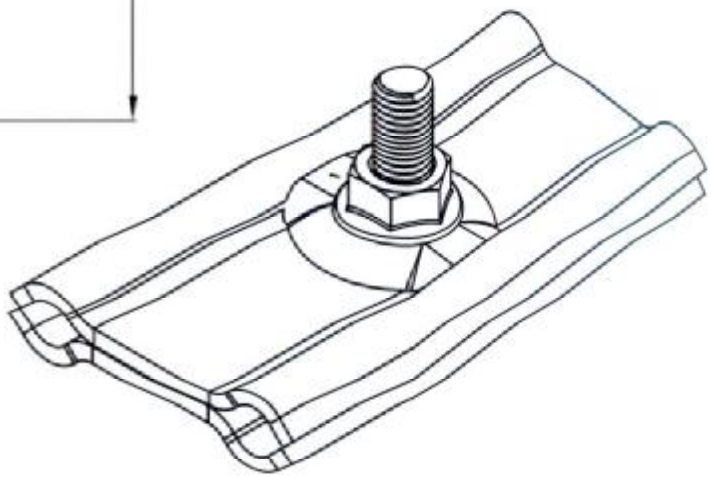
Odchyłka wymiarów nietolerowanych		Materiał	Gatunek	St3S	Masa [kg]	Podziałka	Format	A4
			Nr normy	PN-EN 10142 + A1 : 1997			Arkusz	1
			półfabrykat (nr normy)				Arkuszy	1

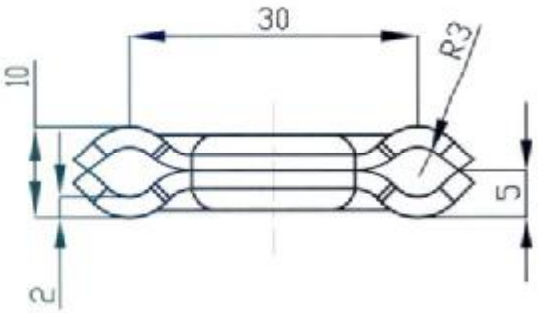
Projektował	M.Stawikowski		10.12.2007	Nazwa rysunku	
Rysował	M.Stawikowski			Uchwyt śrubowy USS□	
Sprawdził				Nr programu maszynowego	---
Zatwierdził				Nr rysunku	3

Nazwisko | Podpis | Data | Nr zmiany

Profesjonalne Systemy Tras Kablowych







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Podpis/Signature

Dokument č. / Document No. FIRES-FR-067-08-ANNEX

Príloha č./Appendix No. 35

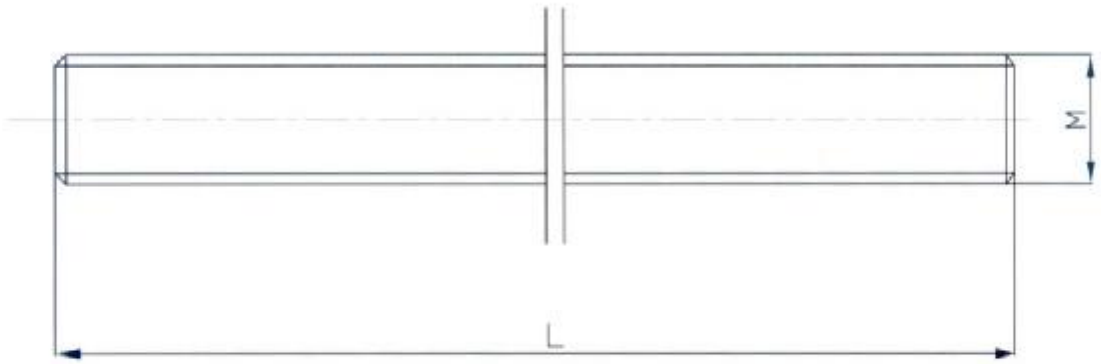
	Odchyłka wymiarów nietolerowanych		Materiał	Gatunek		Masa [kg]	Podziałka	Format A4
				Nr normy	PN-EN 10327:2005			Arkusz
				półfabrykat (nr normy)				Arkuszy

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

Nazwisko | Podpis | Data

Profesjonalne Systemy Tras Kablowych

Nr rysunku 6



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Dátum/Date 03.04.2008

Podpis/Signature

Dokument č./Document No. FIRES-FR-081-08-AUS

Príloha č./Appendix No. 36

M	L
6	2000
8	2000
10	1000

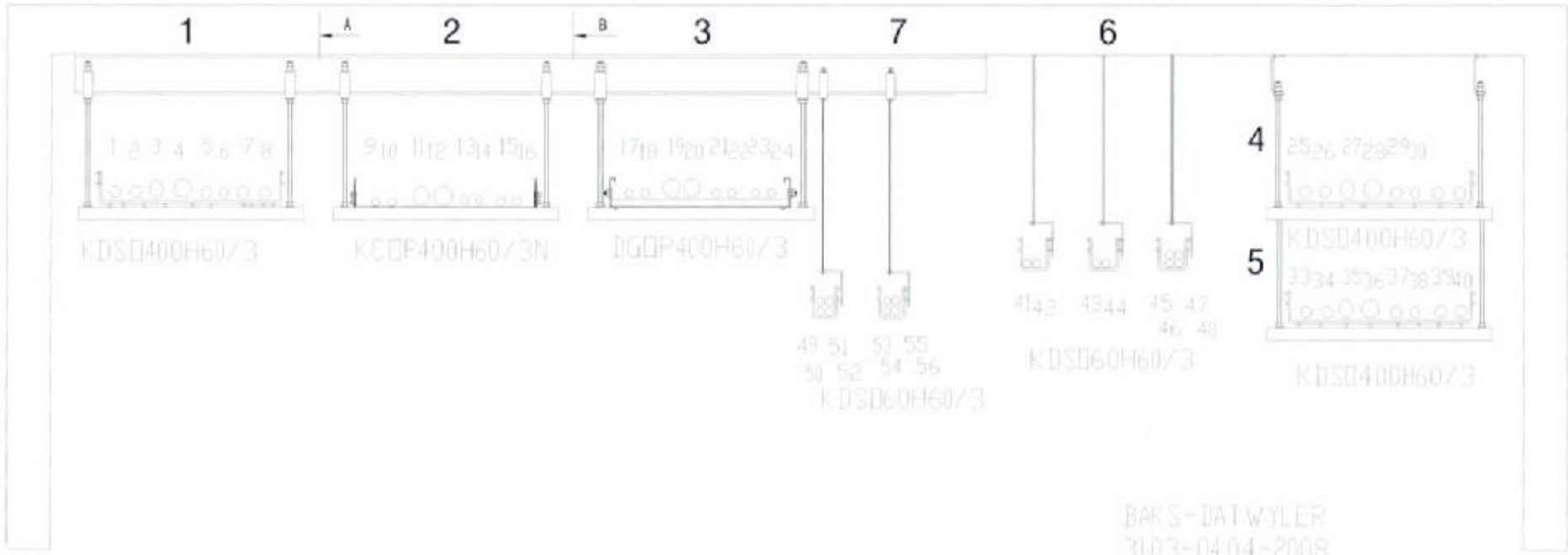
	Dachówka wyrównawcza metalizowanych		Materiał	Gatunek	5,8	Masa [kg]	Podziałka 2:1	Format	A4
				Nr normy	----------	---		Arkusz	1
				półfabrykat (nr normy)				Arkuszy	1

	Nazwisko		Podpis		Data	Nazwa rysunku
Projektował		J.GRODKOWSKI			20.10.05	PRĘT GWINTOWANY
Rysował		J.Grochowski			20.10.05	
Sprawdził		T.WŁODARCZYK			20.10.05	
Zatwierdził		J.KLICZEK			20.10.05	Nr programu maszynowego ---

Nr zmiany

Profesjonalne Systemy Tras Kablowych

Nr rysunku 651001



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Dokument č. / Document No. FIRES-FR-061-08-AMUE

Príloha č./Appendix No. 3

Profesionálne systémy
Tesné káblových

Data 31.03 -04.04..2008

BAKS - DATWYLER Badania FIRES Batizowce

Nr	*Symbol kaba pyrofil® Keram*	*Pozycja*	*Przekrój kabla*	*Konstrukcja mocowania, odległość, obciążenie*	*Uwagi*
1	JE-H(St)H...Bd FE 180/E30-E90	1	2x2x 0.8	Korytko siatkowe KDS 400H60/... B-400/ 1.2 m / 10kg/m Łącznik boku USSO -2 szt Łącznik spodu USSO -2 szt Mocowanie na prętach gwintowanych PGM8/1 i ceowniku CWOP 40H40/0,5 do konstrukcji stalowej I80 za pomocą zacisku ZK 8 i kołków rozporowych PSRO M10x 80	
2	JE-H(St)H...Bd FE 180/E30-E90		2x2x 0.8		
3	(N)HXH FE 180 E90		4x 50		
4	(N)HXH FE 180 E90		4x 50		
5	(N)HXH FE 180 E90		4x 1,5		
6	(N)HXH FE 180 E90		4x 1,5		
7	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
8	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
9	JE-H(St)H... Bd FE 180/E30-E90	2	2x2x 0.8	Korytko kablowe KC0P 400H60/... grubość blachy 1.5 mm B-400/ 1.2 m / 10kg/m Łącznik boku LPOPH60 -2 szt Łącznik spodu BLO... -1 szt Mocowanie na prętach gwintowanych PGM8/1 i ceowniku CWOP 40H40/0,5 do konstrukcji stalowej I80 za pomocą zacisku ZK 8 i kołków rozporowych PSRO M10x 80	
10	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
11	(N)HXH FE 180 E90		4x 50		
12	(N)HXH FE 180 E90		4x 50		
13	(N)HXH FE 180 E90		4x 1,5		
14	(N)HXH FE 180 E90		4x 1,5		
15	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
16	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
17	JE-H(St)H... Bd FE 180/E30-E90	3	2x2x 0.8	Drabinka kablowa DGOP 400H60/... B-400/ 1.2 m / 10kg/m grubość blachy 1.5 mm Łącznik boku LDGOPH60 -2 szt Mocowanie na prętach gwintowanych PGM8/1 i ceowniku CWOP 40H40/0,5 do konstrukcji stalowej I80 za pomocą zacisku ZK 8 i kołków rozporowych PSRO M10x 80	
18	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
19	(N)HXH FE 180 E90		4x 50		
20	(N)HXH FE 180 E90		4x 50		
21	(N)HXH FE 180 E90		4x 1,5		
22	(N)HXH FE 180 E90		4x 1,5		
23	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
24	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
25	JE-H(St)H... Bd FE 180/E30-E90	4	2x2x 0.8	Korytko siatkowe KDS 400H60/... B-400/ 1.2 m / 20kg/m Łącznik boku USSO -2 szt Łącznik spodu USSO -2 szt Mocowanie na prętach gwintowanych PGM10/1 i ceowniku CWOP 40H40/0,5 do betonu za pomocą kołków rozporowych PSRO M10x 80	
26	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
27	(N)HXH FE 180 E90		4x 50		
28	(N)HXH FE 180 E90		4x 50		
29	(N)HXH FE 180 E90		4x 1,5		
30	(N)HXH FE 180 E90		4x 1,5		
31	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
32	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
33	JE-H(St)H... Bd FE 180/E30-E90	5	2x2x 0.8	Korytko siatkowe KDS 400H60/... B-400/ 1.2 m / 20kg/m Łącznik boku USSO -2 szt Łącznik spodu USSO -2 szt Mocowanie na prętach gwintowanych PGM10/1 i ceowniku CWOP 40H40/0,5 do betonu za pomocą kołków rozporowych PSRO M10x 80	
34	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
35	(N)HXCH FE 180 E90		4x 50/25		
36	(N)HXCH FE 180 E90		4x 50/25		
37	(N)HXCH FE 180 E90		4x 1,5/1,5		
38	(N)HXCH FE 180 E90		4x 1,5/1,5		
39	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
40	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		

Nr	*Symbol kaba pyrofil® Keram*	*Pozycja*	*Przekrój kabla*	*Konstrukcja mocowania, odległość, obciążenie*	*Uwagi*
41	(N)HXH FE 180 E90	6	4x 1,5	Korytko siatkowe KDS 60H60/... B-60/ 1.2 m / 1,5kg/m Łącznik boku USSPWO -2 szt Mocowanie na prętach gwintowanych PGM6/1 i wieszaku korytka WKSO do betonu za pomocą tuleji stalowych rozporowych TSRO M6x30	
42	(N)HXH FE 180 E90		4x 1,5		
43	(N)HXCH FE 180 E90		4x 1,5/1,5		
44	(N)HXCH FE 180 E90		4x 1,5/1,5		
45	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
46	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
47	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
48	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
49	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8	Korytko siatkowe KDS 60H60/... B-60/ 1.2 m / 1,5kg/m Łącznik boku USSPWO -2 szt Mocowanie na prętach gwintowanych PGM6/1 i wieszaku korytka WKSO do do konstrukcji stalowej I80 za pomocą zacisku ZK 8 i kołków rozporowych PSRO M10x 80	
50	JE-H(St)H... Bd FE 180/E30-E90		2x2x 0.8		
51	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
52	JE-H(St)HRH...Bd FE 180/E30-E90		2x2x 0.8		
53	(N)HXH FE 180 E90		4x 1,5		
54	(N)HXH FE 180 E90		4x 1,5		
55	(N)HXCH FE 180 E90		4x 1,5/1,5		
56	(N)HXCH FE 180 E90		4x 1,5/1,5		

Lp	Symbol kaba	Średnica kabla	Ciężar kabla	
1	(N)HXCH FE 180 E90 4x 50/25	36mm	3.3 kg/m	
2	(N)HXH FE 180 E90 4x 50	36 mm	3.05 kg/m	
3	(N)HXCH FE 180 E90 4x 1,5/1,5	16mm	0,36 kg/m	
4	(N)HXH FE 180 E90 4x 1,5	15mm	0,34 kg/m	
5	JE-H(St)H.. 2x2x 0.8	8 mm	0.074 kg/m	
6	JE-H(St)HRH 2x2x 0.8	11 mm	,15 kg/m	
7				
8				

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Datum/Date 03.09.2008

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Príloha č. / Appendix No. 39