TEST REPORT FIRES-FR-129-07-AUNE

Cables with integrity function FE180/E90
Type – NHXH, NHXCH, (N)HXH, (N)HXCH, JE-H(St)H

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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-129-07-AUNE**
Tested property: Function in fire
Test method: DIN 4102 – 12:1998-11

Date of issue: **03. 08. 2007**

Name of the product: Cables with integrity function FE180/E90
Type – NHXH, NHXCH, (N)HXH, (N)HXCH, JE-H(St)H

Manufacturer: **Zaklady Kablowe Bitner Celina Bitner,** Friedleina 3/3, 30-009 Kraków, Poland – producer of cables

BAKS, 05-480 Karczew, Jagodne 5, Poland – producer of construction
NIEDAX KLEINHUIS POLSKA Sp. z o. o., ul, Zagórska 133, 42-680 Tarnowskie Góry, Poland - producer of construction
CABLOFIL, ul. T. Kościuszki 227, 40-600 Katowice, Poland - producer of construction

Sponsor: **Zaklady Kablowe Bitner Celina Bitner,** Friedleina 3/3, 30-009 Kraków, Poland

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Task No.: PR-07-0188
Specimen received: 09. 07. 2007
Date of the fire test: 12. 07. 2007
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 specimens was power and communication non-halogen cables with circuit integrity maintenance. Persons witnessing the test:

Representatives of the sponsor: Mrs. Alina Rychlik - Paradowska (Zaklady Kablowe Bitner)
Mr. Adam Cichoń (Zaklady Kablowe Bitner)
Mr. Jan Krajewski (Zaklady Kablowe Bitner)
Mr. Jacek Kliczek (BAKS)
Mr. Marian Dworaczek (NIEDAX)
Mr. Adam Walus (CABLOFIL)

Test directed by: Marek Gorlický
Test carried out by: Miroslav Hudák
Operator: 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 (-50 až +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 54 055	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 businesses BAKS, Niedax and CABLOFIL according to requirements of the sponsor. Mounting of cables and weights into the supporting system was carried out by workers of the test sponsor.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

Test specimen comprised from power and communication non-halogen cables and supportings systems:
- BAKS with accessories – cable trays, cable ladders, ceiling ledges with clamps UKO1, clamps UEF, UDF and sleeves – OZMO;
- Niedax with accessories – clamps SAS;
- CABLOFIL with accessories – basket cable trays.

Cables:	NHXH - 4x1,5 RE E90 MICA	(6 x)
	NHXH - 4x50 RM E90 MICA	(8 x)
	(N)HXH - 4x1,5 RE E90 CERAMIC	(10 x)
	NHXCH - 4x1,5 RE/1,5 E90 MICA	(6 x)
	(N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	(6 x)
	(N)HXCH - 4x10 RE/10 E90 CERAMIC	(2 x)
	NHXCH - 4x50 RM/25 E90 MICA	(6 x)
	JE-H(St)H - 2x2x0,8 E90 MICA	(6 x)
	JE-H(St)H - 2x2x0,8 E90 CERAMIC	(4 x)

Supporting system BAKS: suspension track and ceiling installation were used for specimen test.
Suspension track: was made by three hangers (type WPCO 800) which were fixed to ceiling by four dowels (type PSRO M10x80) in spacing of 1200 mm. Two booms (type WMCO 400) were fixed by screws (type SM M10 x 20) at each hanger. Holders (type UPWO) were fixed at the end of booms. Booms were fixed through these holders by threaded bar M10 with washers and nuts M10 to ceiling holder (type USOV) which was fixed to ceiling by dowel (type PSRO M10x80).
Two trays (type KCOP 300H60/3) were fixed at upper booms and jointed together by two junctions (type LPOPH60N) and by sheet (type BLO N) with screws M6 (type SGN M6x12). Trays were fixed to booms by screws M6 (type SGN M6x12).
Two ladders (type DGOP 400H60/3) were fixed at bottom booms and jointed together by junction (type LDOCH60N) with screws M8 (type SGN M8x14). Ladders were fixed to booms by clips (type ZMO) with screws M8 (type SGN M8x14).
Ceiling installation: was made by cable clips UDF, UEF and sleeves OZMO, which were fixed to ceiling by dowels (type SRO M6x30) in spacing of 300 mm and by ceiling ledges (type SDOC 600) which were fixed to ceiling by three dowels (type PRSO M8x75) in spacing of 300 mm. Cables were fixed to ledges by clips (type UKO1) in spacing of 300 mm.
Types of individual components are from catalogue BAKS 8/2006.
Supporting system NIEDAX: ceiling installation were used for specimen test.
Ceiling installation: was made by cable clips SAS depending on the diameter of cable which were fixed to ceiling by dowels (type DAM M6x50) in spacing of 300 mm.
Supporting system CABLOFIL: suspension track were used for specimen test.
Suspension track No. 1: was made by three hangers (type R41S1000) with holder (type PFN41S) which were fixed to ceiling by two dowels (type HKD-S10x40) in spacing of 1200 mm. Three booms (type C21S400, CU400 and CU100) were fixed by screws (type VHM10x40) at each hanger. Tray (type CF54/100) were fixed at upper booms. Trays (type CF105/300) were fixed at other booms.
Suspension track No. 2: was made by three hangers combined of two horizontal support (type R21S400) and two threaded bar M10 with washers and nuts M10 to ceiling by two dowels (type HKD-S10x40) in spacing of 1200 mm. Trays (type CF54/300) were fixed at horizontal supports.
Suspension track No. 3: was made by three hangers combined of two console (type CEQ100) and threaded bar M8 to ceiling by dowels (type HKD-S8x40) in spacing of 1200 mm. Tray (type CF54/50) were fixed at consoles.

Types of individual components are from catalogue CABLOFIL 9/2006.

Cable penetration through the wall of test furnace was sealed by mineral wool Rockwool.
Load capacity: bearing system was loaded with maximal tolerance according to the standard:

- trays with 10 kg/m and ladders with 20 kg/m.

Line loading 400 mm long and 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
46,5	1,8	23,8	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]**
12. 07. 2007	51,1	14,4

5.2 TEST RESULTS

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

5.3 EVALUATION OF THE TEST

SPECIMENS	Time to first failure/interruption of conductor
Specimens 1,2: cables (N)HXH - 4x1,5 RE E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 3,4: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 5,6: cables (N)HXH - 4x1,5 RE E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 7,8: cables (N)HXCH - 4x10 RE/10 E90 CERAMIC	**90 minutes no failure/interruption**
Specimen 9: cable (N)HXH - 4x1,5 RE E90 CERAMIC	**79 minutes**
Specimen 10: cable (N)HXH - 4x1,5 RE E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 11,12: cables (N)HXH - 4x1,5 RE E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 13,14: cables (N)HXH - 4x1,5 RE E90 CERAMIC	**90 minutes no failure/interruption**
Specimen 15: cable (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	**76 minutes**
Specimen 16: cable (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	**90 minutes no failure/interruption**
Specimen 17: cable NHXH - 4x50 RM E90 MICA	**90 minutes no failure/interruption**
Specimen 18: cable NHXH - 4x50 RM E90 MICA	**41 minutes**
Specimen 19: cable (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	**71 minutes**
Specimen 20: cable (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	**90 minutes no failure/interruption**
Specimens 21,22: cables NHXH - 4x1,5 RE E90 MICA	**90 minutes no failure/interruption**
Specimen 23: cable NHXH - 4x50 RM E90 MICA	**83 minutes**
Specimen 24: cable NHXH - 4x50 RM E90 MICA	**76 minutes**
Specimens 25,26: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	**90 minutes no failure/interruption**
Specimens 27,28: cables NHXCH - 4x50 RM/25 E90 MICA	**90 minutes no failure/interruption**
Specimens 29,30: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	**90 minutes no failure/interruption**
Specimens 31,32: cables NHXCH - 4x50 RM/25 E90 MICA	**90 minutes no failure/interruption**
Specimens 33,34: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	**90 minutes no failure/interruption**
Specimens 35,36: cables NHXCH - 4x50 RM/25 E90 MICA	**90 minutes no failure/interruption**
Specimens 37,38: cables NHXH - 4x1,5 RE E90 MICA	**90 minutes no failure/interruption**
Specimens 39,40: cables NHXH - 4x50 RM E90 MICA	**90 minutes no failure/interruption**
Specimen 41: cable NHXH - 4x1,5 RE E90 MICA	**46 minutes**
Specimen 42: cable NHXH - 4x1,5 RE E90 MICA	**45 minutes**
Specimens 43,44: cables NHXH - 4x50 RM E90 MICA	**90 minutes no failure/interruption**
Specimen 52: cable JE-H(St)H - 2x2x0,8 E90 CERAMIC	**77 minutes**
Specimen 53: cable JE-H(St)H - 2x2x0,8 E90 CERAMIC	**30 minutes**
Specimen 54: cable JE-H(St)H - 2x2x0,8 E90 CERAMIC	**87 minutes**
Specimen 55: cable JE-H(St)H - 2x2x0,8 E90 CERAMIC	**39 minutes**
Specimens 56,57: cables JE-H(St)H - 2x2x0,8 E90 MICA	**90 minutes no failure/interruption**
Specimen 58: cable JE-H(St)H - 2x2x0,8 E90 MICA	**90 minutes no failure/interruption**
Specimen 59: cable JE-H(St)H - 2x2x0,8 E90 MICA	**88 minutes**
Specimen 60: cable JE-H(St)H - 2x2x0,8 E90 MICA	**79 minutes**
Specimen 61: cable JE-H(St)H - 2x2x0,8 E90 MICA	**90 minutes no failure/interruption**

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

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

SKÚŠOBNÉ LABORATÓRIUM • PRÜFLABORATORIUM • TESTING LABORATORY • FIRES The Experts on Fire Safety -1-

Miroslav Hudák
technician of the testing laboratory

7. NORMATIVE REFERENCES

DIN 4102 – 2:1977-09	Fire behavior 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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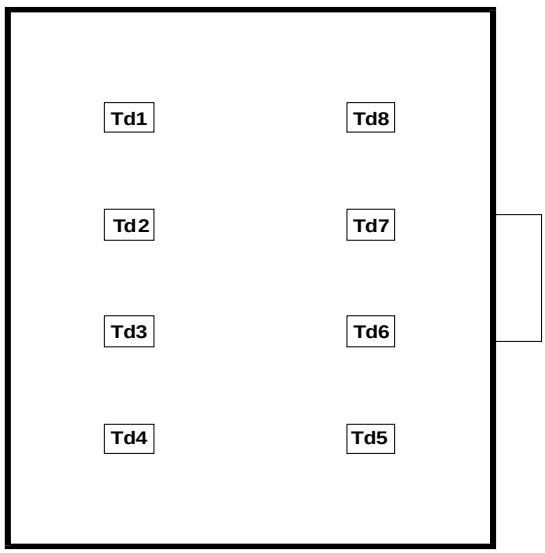
Measured values inside the test furnace

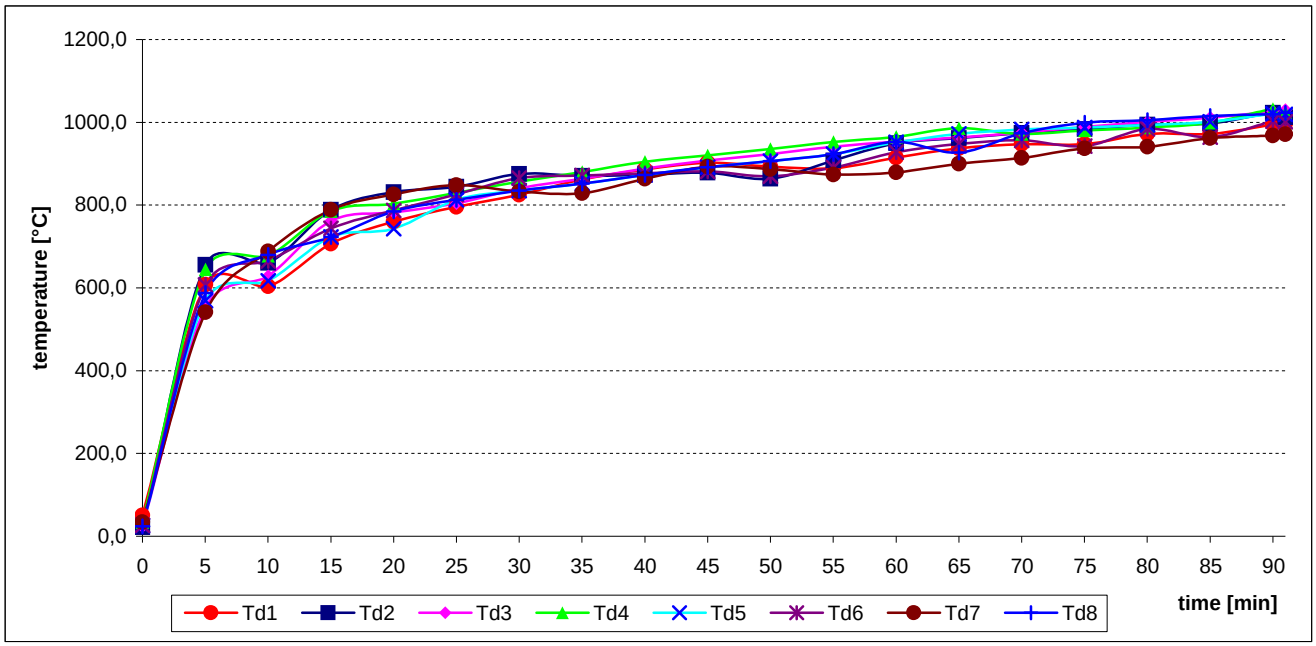
Time	Temperature [°C]											Deviation	Pressure
t [min]	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d_e [%]	p [Pa]
0	50,6	21,7	24,1	33,7	25,9	26,4	34,0	23,9	30,0	20,0	18,1	0,0	0,0
5	607,6	656,0	552,6	645,1	569,3	606,7	541,0	587,9	595,8	576,4	18,2	-5,7	15,8
10	604,0	660,0	628,5	677,7	616,9	664,9	688,0	680,0	652,5	678,4	18,2	-2,0	11,6
15	706,9	788,3	761,3	785,2	722,6	743,5	788,3	723,2	752,4	738,6	17,8	-0,9	16,3
20	759,9	831,5	782,2	803,4	742,7	786,8	825,4	784,9	789,6	781,4	17,5	-0,3	19,3
25	795,4	844,6	804,5	829,8	812,7	825,5	848,4	812,7	821,7	814,6	17,4	0,0	17,9
30	825,2	875,3	840,1	856,4	834,9	865,5	833,0	834,9	845,7	841,8	17,3	0,2	18,9
35	862,4	870,5	863,5	879,9	851,8	871,4	828,8	851,8	860,0	864,8	17,3	0,1	19,8
40	885,9	872,6	888,3	904,4	872,8	876,5	863,6	872,8	879,6	884,7	17,4	0,0	18,9
45	902,5	878,0	907,7	920,3	891,2	881,5	893,2	891,2	895,7	902,3	17,4	0,0	19,1
50	892,9	863,5	923,0	935,8	906,0	870,0	887,2	906,0	898,1	918,1	17,5	-0,2	19,9
55	889,1	907,7	941,3	952,8	923,2	890,5	873,6	923,2	912,7	932,3	17,7	-0,5	19,1
60	914,4	949,4	953,2	964,6	951,5	927,6	879,5	952,6	936,6	945,3	18,0	-0,6	18,8
65	936,9	961,9	963,2	986,2	971,6	948,1	899,9	926,8	949,3	957,3	18,2	-0,7	18,3
70	947,4	974,4	975,1	972,1	982,4	956,5	913,7	973,6	961,9	968,4	18,3	-0,7	19,3
75	946,9	983,6	989,1	980,3	987,5	942,2	937,1	998,6	970,7	978,7	18,3	-0,7	18,1
80	972,2	994,4	1001,0	987,4	993,9	984,4	940,9	1005,0	984,9	988,4	18,4	-0,7	17,3
85	972,0	997,7	1011,0	998,7	1001,0	963,9	962,2	1015,0	990,2	997,4	18,6	-0,7	17,1
90	994,7	1023,0	1026,0	1032,0	1021,0	1003,0	968,1	1020,0	1011,0	1005,9	18,6	-0,6	14,6
91	996,7	1012,0	1030,0	1024,0	1019,0	1001,0	970,8	1023,0	1009,6	1007,6	18,7	-0,6	15,6

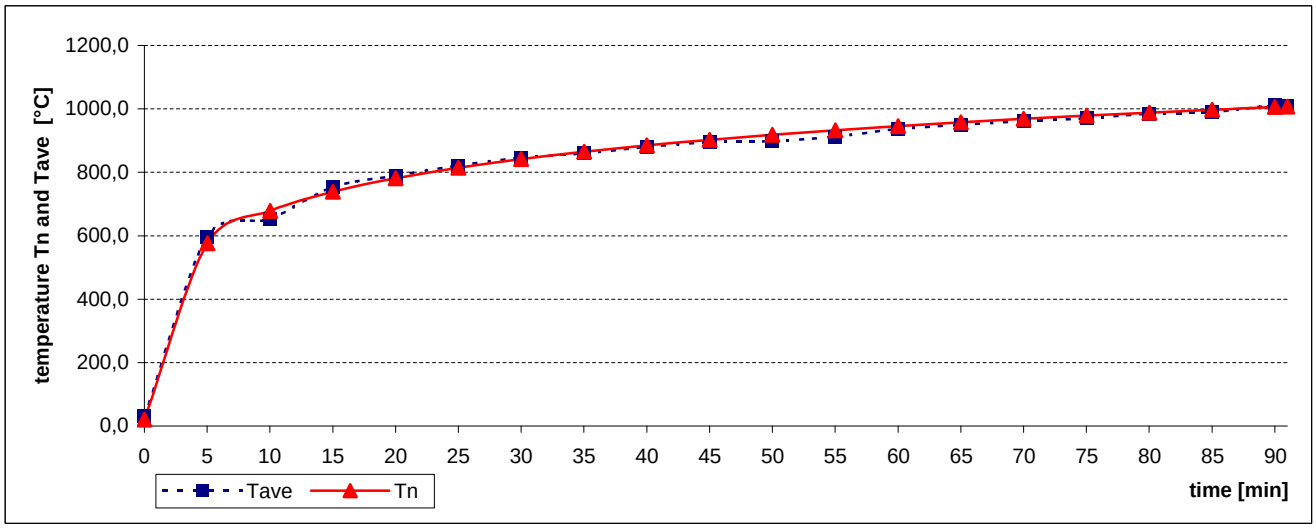
Tave Average temperature in the test furnace calculated from plate thermometers
Tn Standard temperature in the test furnace laid down to test guideline
To Ambient temperature
d_e Deviation of the average temperature from the standard temperature calculated according to test guideline
p Pressure inside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

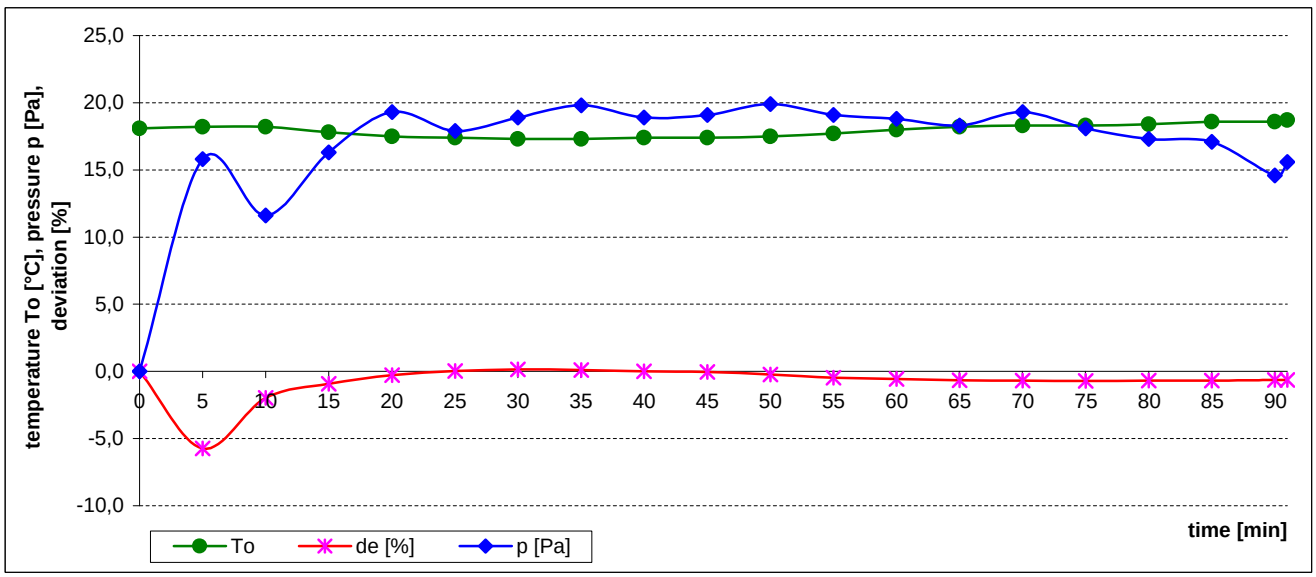
Layout of measuring points in the test furnace:



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 E90 CERAMIC
Specimens 3,4: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC
Specimens 5.6: cables (N)HXH - 4x1,5 RE E90 CERAMIC
Specimens 7,8: cables (N)HXCH - 4x10 RE/10 E90 CERAMIC

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	79:13
	34-L2	79:13
	35-L3	79:13
	36-PEN	79:13
S10	37-L1	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption
S11	41-L1	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S12	45-L1	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
S15	57-L1	x
	58-L2	76:54
	59-L3	76:54
	60-PEN	x
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)HXH - 4x1,5 RE E90 CERAMIC
Specimens 11,12: cables (N)HXH - 4x1,5 RE E90 CERAMIC
Specimens 13,14: cables (N)HXH - 4x1,5 RE E90 CERAMIC
Specimens 15,16: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC

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	41:59
	70-L2	41:59
	71-L3	x
	72-PEN	x
S19	73-L1	71:30
	74-L2	x
	75-L3	71:30
	76-PEN	x
S20	77-L1	no failure / interruption
	78-L2	no failure / interruption
	79-L3	no failure / interruption
	80-PEN	no failure / interruption
S21	81-L1	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	x
	90-L2	83:28
	91-L3	83:28
	92-PEN	x
S24	93-L1	76:11
	94-L2	76:11
	95-L3	x
	96-PEN	x

Specimens 17,18: cables NHXH - 4x50 RM E90 MICA
Specimens 19,20: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC
Specimens 21,22: cables NHXH - 4x1,5 RE E90 MICA
Specimens 23,24: cables NHXH - 4x50 RM E90 MICA

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

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

Measured time of tested specimens from S25 to S32

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	no failure / interruption
	106-L2	no failure / interruption
	107-L3	no failure / interruption
	108-PEN	no failure / interruption
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	no failure / interruption
	118-L2	no failure / interruption
	119-L3	no failure / interruption
	120-PEN	no failure / interruption
S31	121-L1	no failure / interruption
	122-L2	no failure / interruption
	123-L3	no failure / interruption
	124-PEN	no failure / interruption
S32	125-L1	no failure / interruption
	126-L2	no failure / interruption
	127-L3	no failure / interruption
	128-PEN	no failure / interruption

Specimens 25,26: cables NHXCH - 4x1,5 RE/1,5 E90 MICA
Specimens 27,28: cables NHXCH - 4x50 RM/25 E90 MICA
Specimens 29,30: cables NHXCH - 4x1,5 RE/1,5 E90 MICA
Specimens 31,32: cables NHXCH - 4x50 RM/25 E90 MICA

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

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

Measured time of tested specimens from S33 to S40

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S33	129-L1	no failure / interruption
	130-L2	no failure / interruption
	131-L3	no failure / interruption
	132-PEN	no failure / interruption
S34	133-L1	no failure / interruption
	134-L2	no failure / interruption
	135-L3	no failure / interruption
	136-PEN	no failure / interruption
S35	137-L1	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	no failure / interruption
	142-L2	no failure / interruption
	143-L3	no failure / interruption
	144-PEN	no failure / interruption
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S39	153-L1	no failure / interruption
	154-L2	no failure / interruption
	155-L3	no failure / interruption
	156-PEN	no failure / interruption
S40	157-L1	no failure / interruption
	158-L2	no failure / interruption
	159-L3	no failure / interruption
	160-PEN	no failure / interruption

Specimens 33,34: cables NHXCH - 4x1,5 RE/1,5 E90 MICA
Specimens 35,36: cables NHXCH - 4x50 RM/25 E90 MICA
Specimens 37,38: cables NHXH - 4x1,5 RE E90 MICA
Specimens 39,40: cables NHXH - 4x50 RM E90 MICA

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

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

Measured time of tested specimens from S41 to S44

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S41	161-L1	x
	162-L2	x
	163-L3	46:32
	164-PEN	x
S42	165-L1	x
	166-L2	45:09
	167-L3	45:09
	168-PEN	no failure
S43	169-L1	no failure / interruption
	170-L2	no failure / interruption
	171-L3	no failure / interruption
	172-PEN	no failure / interruption
S44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption

Specimens 41,42: cables NHXH - 4x1,5 RE E90 MICA
Specimens 43,44: cables NHXH - 4x50 RM E90 MICA

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

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

Measured time of tested specimens from S52 to S61

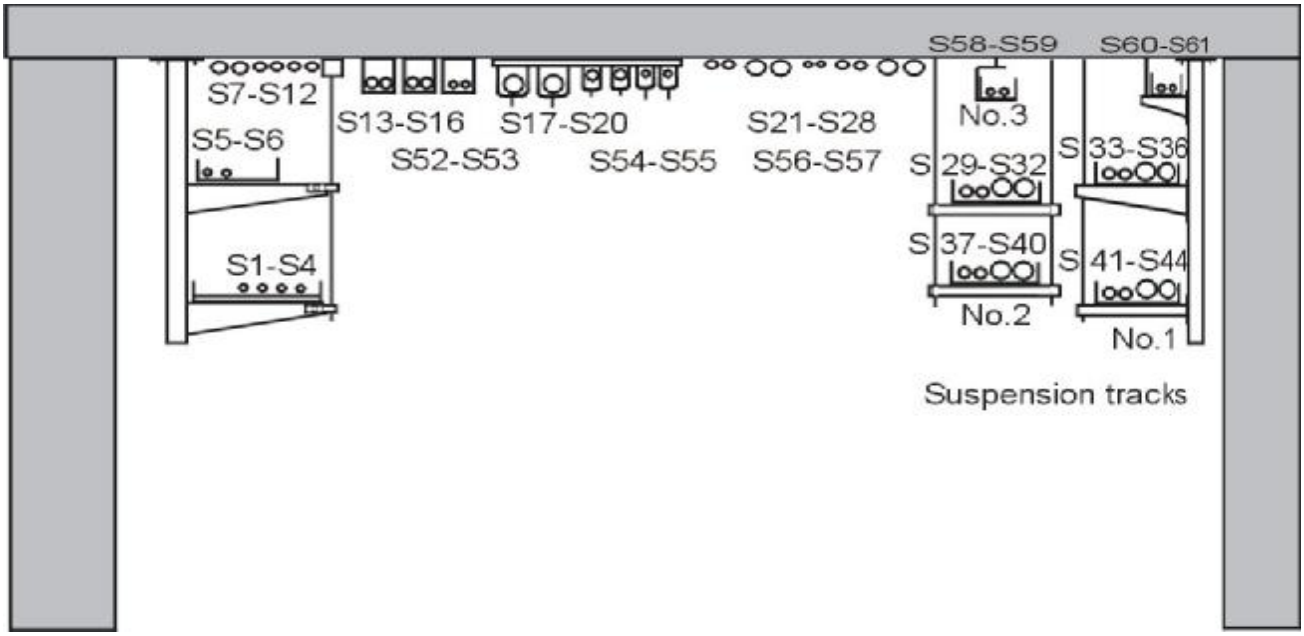
Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52	209-L	77:56
	210-PEN	77:56
	211-L	77:56
	212-PEN	77:56
S53	213-L	30:32
	214-PEN	30:32
	215-L	30:32
	216-PEN	30:32
S54	217-L	x
	218-PEN	x
	219-L	87:40
	220-PEN	87:40
S55	221-L	x
	222-PEN	x
	223-L	39:34
	224-PEN	39:34
S56	225-L	no failure / interruption
	226-PEN	no failure / interruption
	227-L	no failure / interruption
	228-PEN	no failure / interruption
S57	229-L	no failure / interruption
	230-PEN	no failure / interruption
	231-L	no failure / interruption
	232-PEN	no failure / interruption
S58	233-L	no failure / interruption
	234-PEN	no failure / interruption
	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59	237-L	x
	238-PEN	88:16
	239-L	x
	240-PEN	x
S60	241-L	79:14
	242-PEN	79:14
	243-L	x
	244-PEN	x
S61	245-L	no failure / interruption
	246-PEN	no failure / interruption
	247-L	no failure / interruption
	248-PEN	no failure / interruption

Specimens 52,53: cables JE-H(St)H - 2x2x0,8 E90 CERAMIC
Specimens 54,55: cables JE-H(St)H - 2x2x0,8 E90 CERAMIC
Specimens 56,57: cables JE-H(St)H - 2x2x0,8 E90 MICA
Specimens 58,59: cables JE-H(St)H - 2x2x0,8 E90 MICA
Specimens 60,61: cables JE-H(St)H - 2x2x0,8 E90 MICA

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

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

Layout of cables in the test furnace



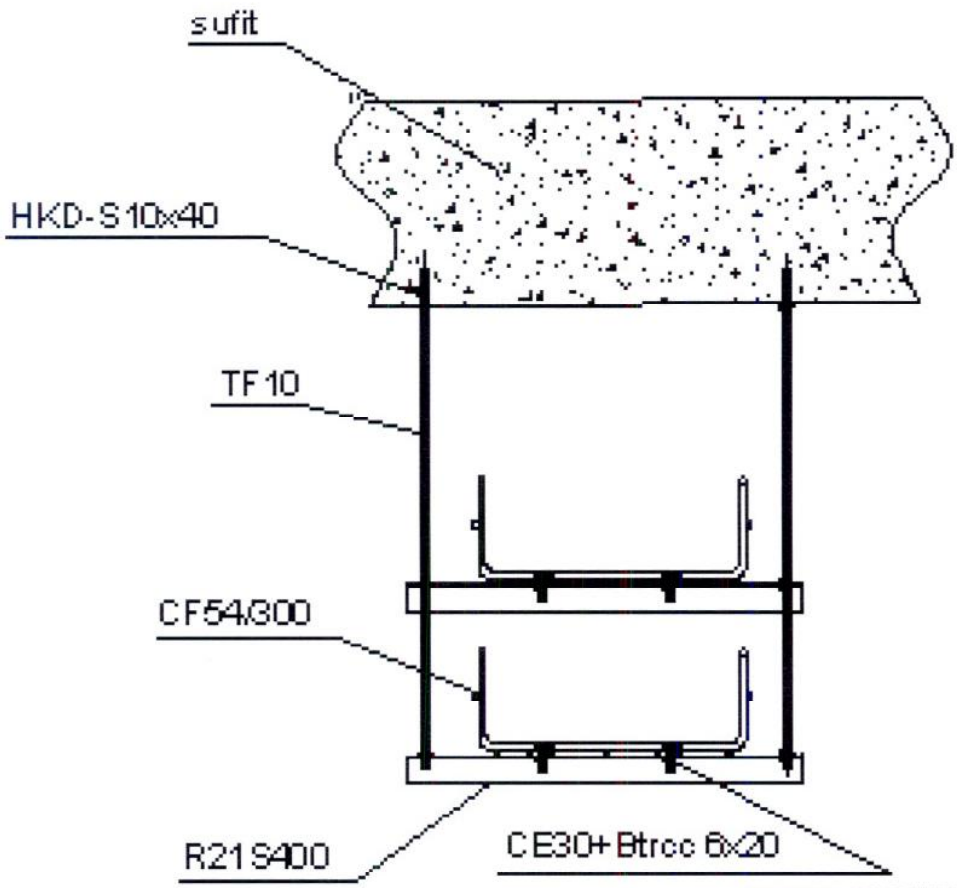
Specimens 1,2: cables (N)HXH - 4x1,5 RE E90 CERAMIC	Specimens placed in the ladder (BAKS)
Specimens 3,4: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	
Specimens 5.6: cables (N)HXH - 4x1,5 RE E90 CERAMIC	Specimens placed in the tray (BAKS)
Specimens 7,8: cables (N)HXCH - 4x10 RE/10 E90 CERAMIC	Specimens placed in ceiling clips UEF (BAKS) in spacing of 300 mm
Specimens 9,10: cables (N)HXH - 4x1,5 RE E90 CERAMIC	
Specimens 11,12: cables (N)HXH - 4x1,5 RE E90 CERAMIC	Specimens placed in ceiling clips UDF (BAKS) in spacing of 300 mm
Specimens 13,14: cables (N)HXH - 4x1,5 RE E90 CERAMIC	Specimens placed in ceiling clips OZMO (BAKS) in spacing of 300 mm
Specimens 15,16: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	
Specimens 17,18: cables NHXH - 4x50 RM E90 MICA	Specimens placed in ceiling profile ledges with clips UKO (BAKS) in spacing of 300 mm
Specimens 19,20: cables (N)HXCH - 4x1,5 RE/1,5 E90 CERAMIC	
Specimens 21,22: cables NHXH - 4x1,5 RE E90 MICA	Specimens placed in ceiling clips SAS (NIEDAX) in spacing of 300 mm
Specimens 23,24: cables NHXH - 4x50 RM E90 MICA	
Specimens 25,26: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	
Specimens 27,28: cables NHXCH - 4x50 RM/25 E90 MICA	
Specimens 29,30: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.2
Specimens 31,32: cables NHXCH - 4x50 RM/25 E90 MICA	
Specimens 33,34: cables NHXCH - 4x1,5 RE/1,5 E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.1
Specimens 35,36: cables NHXCH - 4x50 RM/25 E90 MICA	
Specimens 37,38: cables NHXH - 4x1,5 RE E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.2
Specimens 39,40: cables NHXH - 4x50 RM E90 MICA	
Specimens 41,42: cables NHXH - 4x1,5 RE E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.1
Specimens 43,44: cables NHXH - 4x50 RM E90 MICA	
Specimens 52,53: cables JE-H(St)H - 2x2x0,8 E90 CERAMIC	Specimens placed in ceiling clips OZMO (BAKS) in spacing of 300 mm
Specimens 54,55: cables JE-H(St)H - 2x2x0,8 E90 CERAMIC	Specimens placed in ceiling profile ledges with clips UKO (BAKS) in spacing of 300 mm
Specimens 56,57: cables JE-H(St)H - 2x2x0,8 E90 MICA	Specimens placed in ceiling clips SAS (NIEDAX) in spacing of 300 mm
Specimens 58,59: cables JE-H(St)H - 2x2x0,8 E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.3
Specimens 60,61: cables JE-H(St)H - 2x2x0,8 E90 MICA	Specimens placed in the basket cable tray (CABLOFIL) Suspension track No.1

Photos taken before the test

Photos taken after the termination of the test

ZESTAWIENIE MATERIAŁÓW

Lp.	Element	Ilość [szt]
1.	pręt gwintowany TF10	6
2.	nakrętka HM10	24
3.	kształtownik R21S400	6
4.	kotwa HILTI HKD-S10x40	6
5.	zacisk CE30+ BTRCC 6x20	10
6.	Fastrut FS41	2



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Dokument č./Document No. FIRES-FR-129-07-AUVE

Príloha č./Appendix No. 13

odległość między mocowaniami
do 1,25 metra

max. obciążenie 20 kg/m

ZESTAWIENIE MATERIAŁÓW

Lp.	Element	Ilość [szt]
1.	Szyna R41S500	3
2.	pręt gwintowany TF8	4
3.	nakrętka EEC8	18
4.	Stopa PFN41S	3
5.	kotwa HILTI HKD-S10x40	6
6.	zestaw CE30+BTRCC	12
7.	Wspornik CU100	3
8.	Wspornik C21S400	3
9.	VHM10x40+EEC10	12

10.	CU400	3
11.	kotwa Hilti HKD-S 8x40	6
12.	Przepust EZPath EZDP33	2
13.	śruba VHM12x70 + MH12	6

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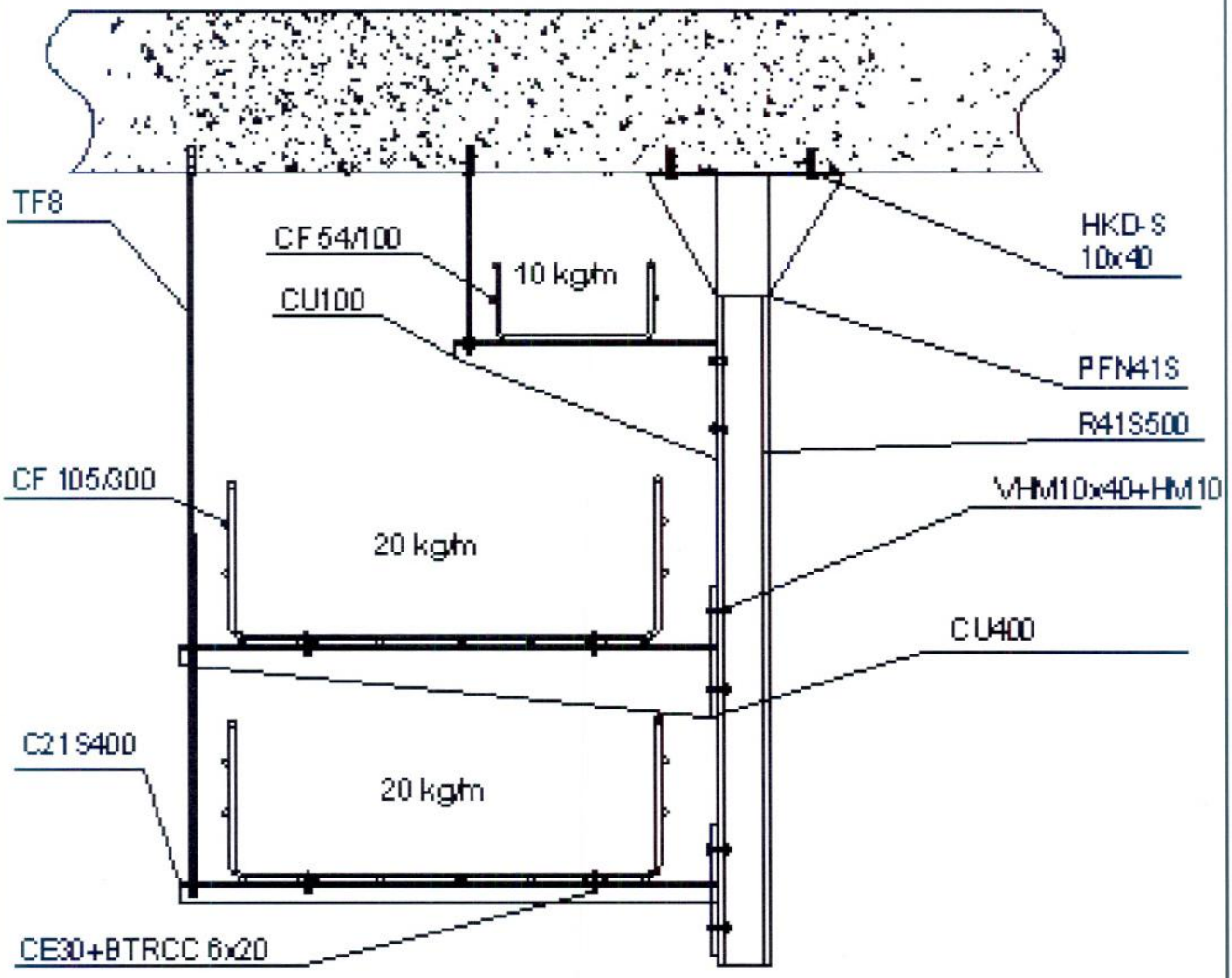
Príloha č./Appendix No. 1

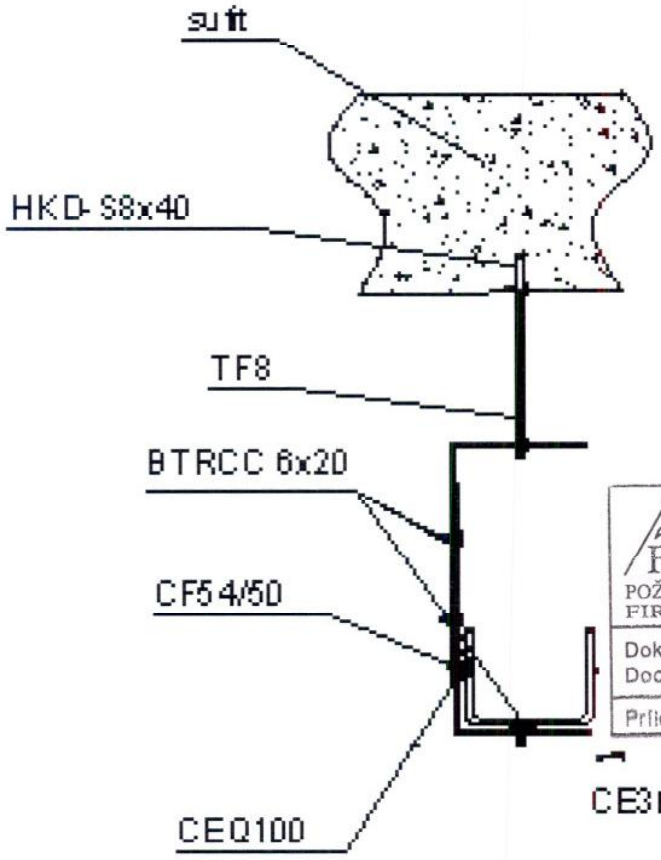


odległość między mocowaniami
co 1,25 metra

max. obciążenie 20 kg/m

ZESTAWIENIE MATERIAŁÓW

Lp.	Element	Ilość [szt]
1.	pręt gwintowany TF8	3
2.	nakrętka wieńcowa EEC8	6
3.	CEQ 100	6
4.	kotwa HILTI HKD-S8x40	3
5.	zacisk CE30	6
6.	zestaw BTRCC 6x20	9



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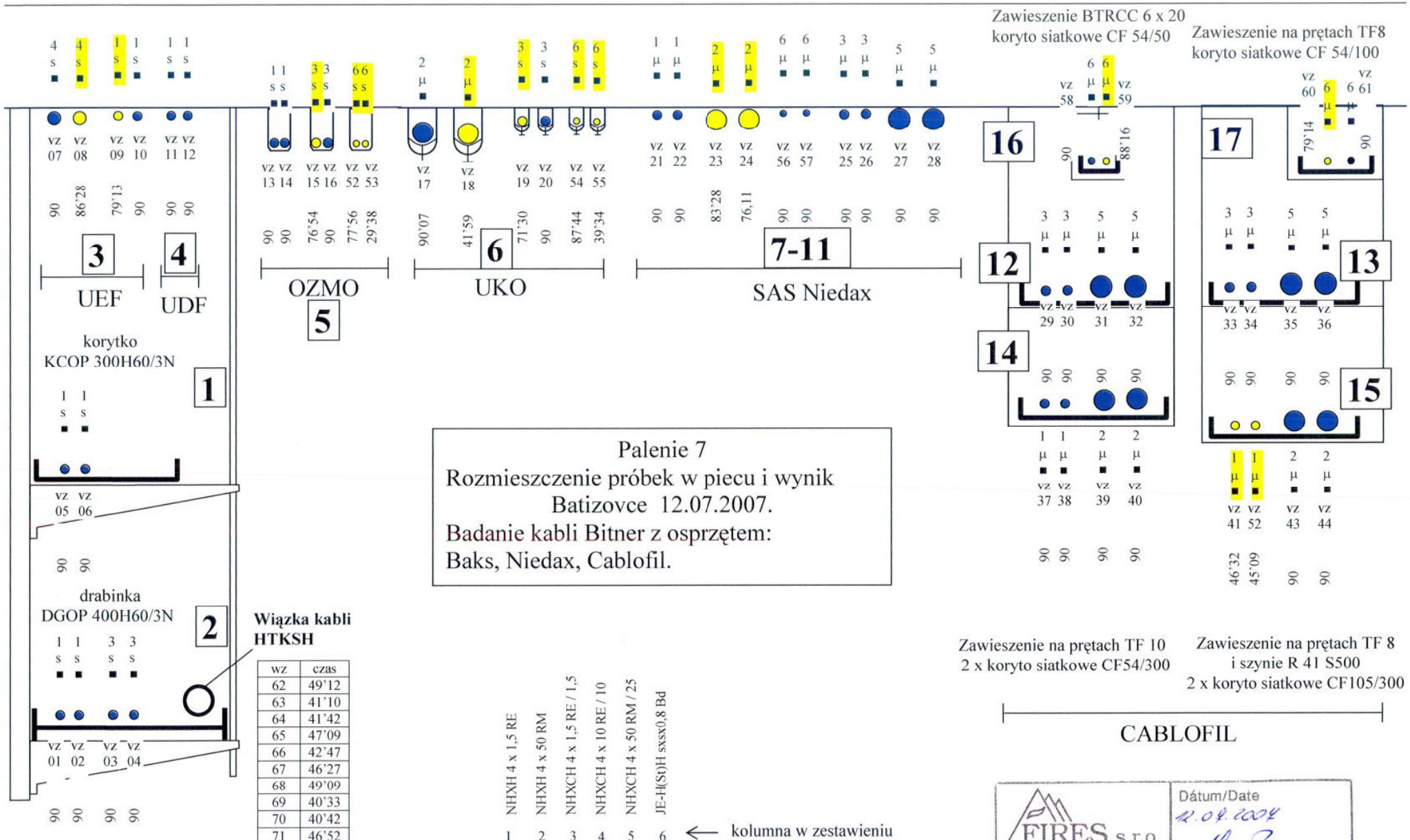
Dokument č./Document No. FIRES-FR-129-09-AUKE

Príloha č./Appendix No. 15

odległość między mocowaniami
do 1,25 metra

max. obciążenie 5 kg/m



wz	czas
62	49'12
63	41'10
64	41'42
65	47'09
66	42'47
67	46'27
68	49'09
69	40'33
70	40'42
71	46'52

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Dokument č. / Document No. FIRES-FR-125-04 Annex

Príloha č./Appendix No. 16

Zestawienie kabli i osprzętu.

Kable BITNER + osprzęt BAKS

Lp	Symbol kabla	Osprzęt	Odległość podpór	obciążenie	pozycja w komorze	czas
5	(N)HXH 4 x 1,5	Tray 300 H60	1,2m	10kg/m	1	
6	(N)HXH 4 x 1,5					
1	(N)HXH 4 x 1,5	Ladder 400 H60	1,2m kotwa PSROM10x80	20kg/m	2	
2	(N)HXH 4 x 1,5					
3	(N)HXCH 4 x 1,5/1,5					
4	(N)HXCH 4 x 1,5/1,5					
62-71	10x HTKSH 4x2x1					
7	(N)HXCH 4 x 10/10	UEF	300mm kotwa SROM6x30		3	
8	(N)HXCH 4 x 10/10					
9	(N)HXH 4 x 1,5					
10	(N)HXH 4 x 1,5					
11	(N)HXH 4 x 1,5	UDF	300mm kotwa SROM6x30		4	
12	(N)HXH 4 x 1,5					
13	(N)HXH 4 x 1,5	OZMO	300mm kotwa SROM6x30	1,1kg/m	5	
14	(N)HXH 4 x 1,5					
15	(N)HXCH 4 x 1,5/1,5					
16	(N)HXCH 4 x 1,5/1,5					
52	JE-H(St)H 2 x 2 x 0,8					
53	JE-H(St)H 2 x 2 x 0,8					
17	NHXH 4 x 50	UKO+ SDOC	300mm kotwa PSROM8x75		6	
18	NHXH 4 x 50					
19	(N)HXCH 4 x 1,5/1,5					
20	(N)HXCH 4 x 1,5/1,5					
54	JE-H(St)H 2 x 2 x 0,8					
55	JE-H(St)H 2 x 2 x 0,8					

Kable BITNER + osprzęt NIEDAX

Lp	Symbol kabla	Osprzęt	Odległość podpór	obciążenie	pozycja w komorze	czas
21	NHXH 4 x 1,5	SAS 18	300mm kotwa DAM 6x5		7	
22	NHXH 4 x 1,5					
23	NHXH 4 x 50	SAS 47			8	
24	NHXH 4 x 50					
56	JE-H(St)H 2 x 2 x 0,8	SAS 12			9	
57	JE-H(St)H 2 x 2 x 0,8					
25	NHXH 4 x 1,5	SAS 20			10	
26	NHXH 4 x 1,5					
27	NHXH 4 x 50	SAS 47			11	
28	NHXH 4 x 50					

Zestawienie kabli i osprzętu.

Kable BITNER + osprzęt CABLOFIL

Lp	Symbol kabla	Osprzęt	Odległość podpór	obciążenie	pozycja w komorze	czas
29	NHXCH 4 x 1,5/1,5	Basket cable tray Rys.3.	1,2 m	20kg/m	12	
30	NHXCH 4 x 1,5/1,5					
31	NHXCH 4 x 50/25					
32	NHXCH 4 x 50/25					
33	NHXCH 4 x 1,5/1,5	Basket cable tray Rys.1.	1,2 m	20kg/m	13	
34	NHXCH 4 x 1,5/1,5					
35	NHXCH 4 x 50/25					
36	NHXCH 4 x 50/25					
37	NHXH 4 x 1,5	Basket cable tray Rys.3.	1,2 m	20kg/m	14	
38	NHXH 4 x 1,5					
39	NHXH 4 x 50					
40	NHXH 4 x 50					
41	NHXH 4 x 1,5	Basket cable tray Rys.1.	1,2 m	20kg/m	15	
42	NHXH 4 x 1,5					
43	NHXH 4 x 50					
44	NHXH 4 x 50					
58	JE-H(St)H 2 x 2 x 0,8	Basket cable tray Rys.2.	1,2 m	5kg/m	16	
59	JE-H(St)H 2 x 2 x 0,8					
60	JE-H(St)H 2 x 2 x 0,8	Basket cable tray Rys.1.	1,2 m	10kg/m	17	
61	JE-H(St)H 2 x 2 x 0,8					

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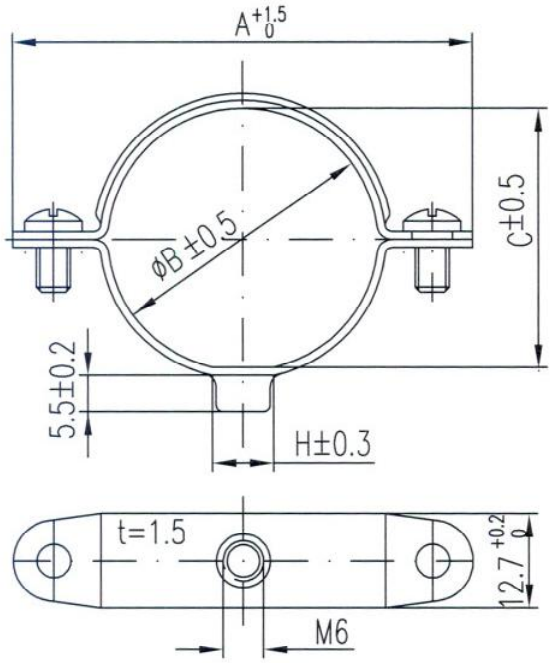
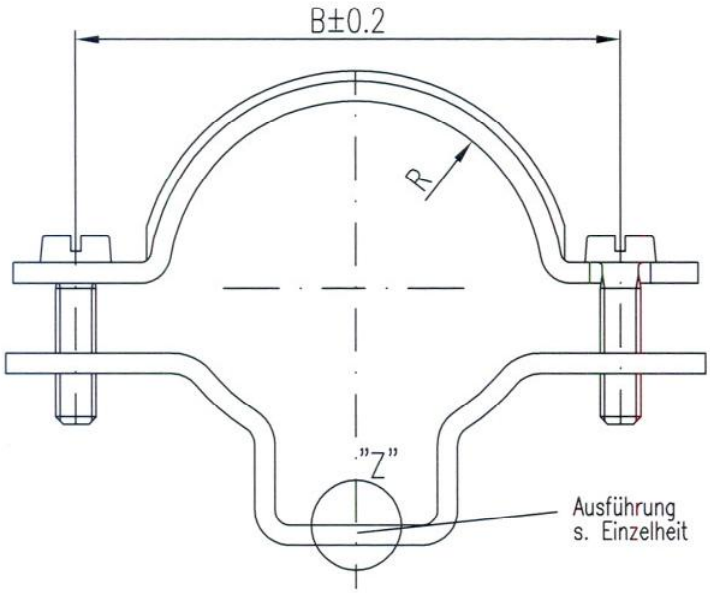
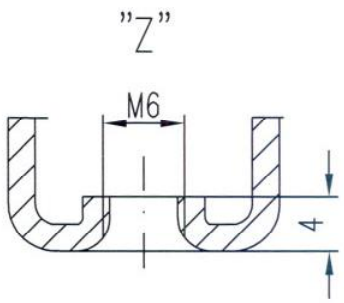
Príloha č./Appendix No. 18



Mod.–Nr.	A	B	C	H	Spannbereich
SAS 8	34.7	8	6	5.3	7.5 – 10
SAS 10	35.5	10	8	6	10 – 11
SAS 12	41.3	12	10	6.8	11 – 13
SAS 14	41	14	12	7	13 – 15
SAS 16	41.4	16	14	8	15 – 17
SAS 18	42	18	16	8.3	17 – 19
SAS 20	48.3	20	18	8.3	19 – 21
SAS 22	47.2	22	20	9	21 – 23
SAS 24	54.4	24	22	8	23 – 25
SAS 26	52.7	26	24	8.3	25 – 27
SAS 28	57	28	26	8	27 – 29
SAS 30	62.8	30	28	10	28 – 30



Modell Nr.	Spann–bereich	R	B	b
SAS 38	29–38	18.5	53.7	16
SAS 47	38–47	23.5	65.2	16
SAS 55	47–55	27.5	74.7	18
SAS 63	55–63	31.5	84	18



NIEDAX GmbH & Co. KG Linz/Rhein

Verwendung:

Ausgabe vom: 25.06.2003

Einzelverlegung Schraubabstandschellen SAS 8 – SAS 63

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Dátum/Date 12. 04. 2004

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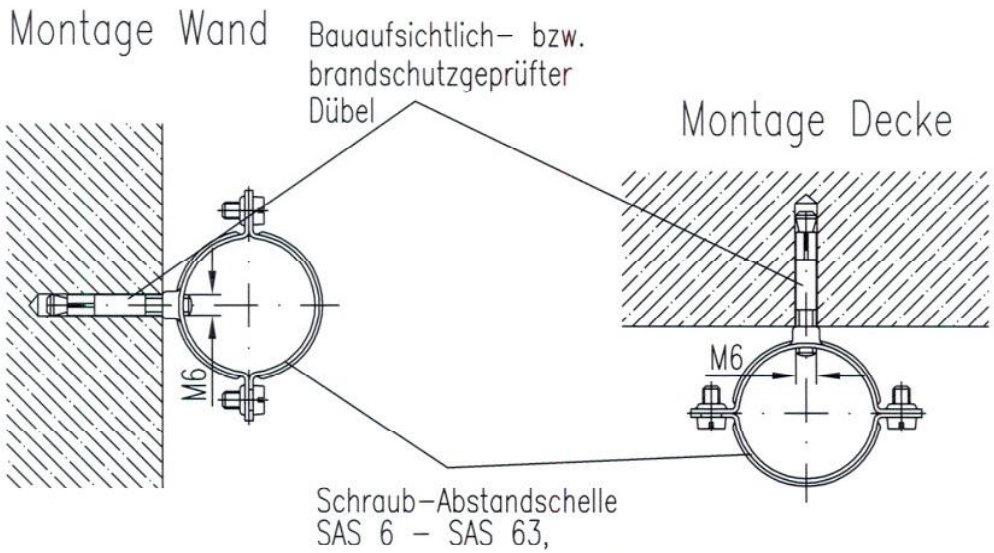
Dokument č. / Document No. FIRES-FR-119-04-ANNEX

Príloha č./Appendix No. 19



NIEDAX GmbH & Co. KG Linz/Rhein	Verwendung: Einzelverlegung mit Schraubabstandschellen	Ausgabe vom: 25.06.2003

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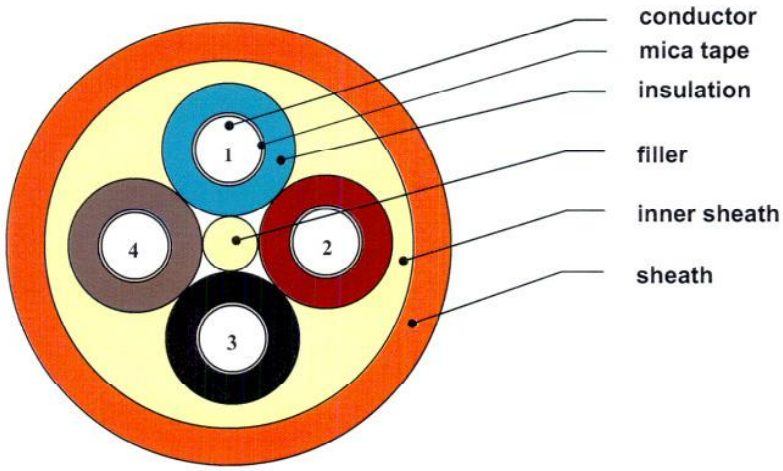
Dokument č. Document No. FIRES-FR-129-08-AWE	
Príloha č./Appendix No. 20	

NHXH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

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

CONSTRUCTION

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

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

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

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

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 12.02.2008 Podpis/Signature
Dokument č. Document No. FIRES-FR-129-04-ANXE	
Príloha č./Appendix No. 27	

NHXH E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5 ÷ 240
5 ÷ 7	1,5 ÷ 70
7 ÷ 10	1,5 ÷ 25
10 ÷ 24	1,5 ÷ 2,5

Operating voltage	0,6/1kV
Voltage test	4000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{14}

Operating temperature range during operation during installation	 -30°C up to +70°C -5°C up to +50°C
Minimum bending radius	15 x D single core 12 x D multi core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0266

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

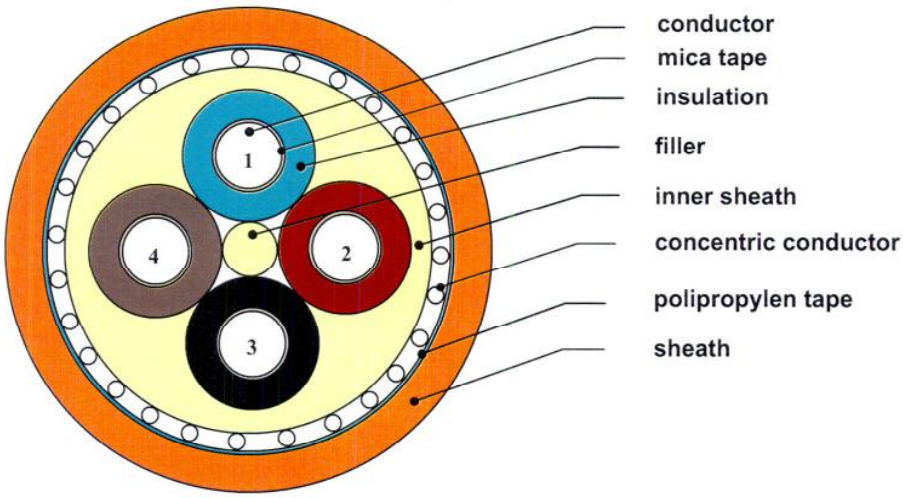
Dátum/Date
12. 09. 2014
Podpis/Signature

Dokument č./Document No. FIRES-FR-129-01 ANE

Príloha č./Appendix No. 22

NHXCH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

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

CONSTRUCTION

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

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

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

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

polipropylen tape

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

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 12. 08. 2008 Podpis/Signature
Dokument č. Document No. FIRES-FR-129-08-AWE	
Príloha č./Appendix No. 23	

NHXCH E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5/1,5 ÷ 150/70
5 ÷ 7	1,5/1,5 ÷ 4/4
10 ÷ 24	1,5/2,5 ÷ 2,5/10

Operating voltage	0,6/1kV
Voltage test	4000 V, 50 Hz
Insulation resistivity at 20°C, minimum	10^{14}

Operating temperature range during operation during installation	 -30°C up to +70°C -5°C up to +50°C
Minimum bending radius	15 x D single core 12 x D multi core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0266

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

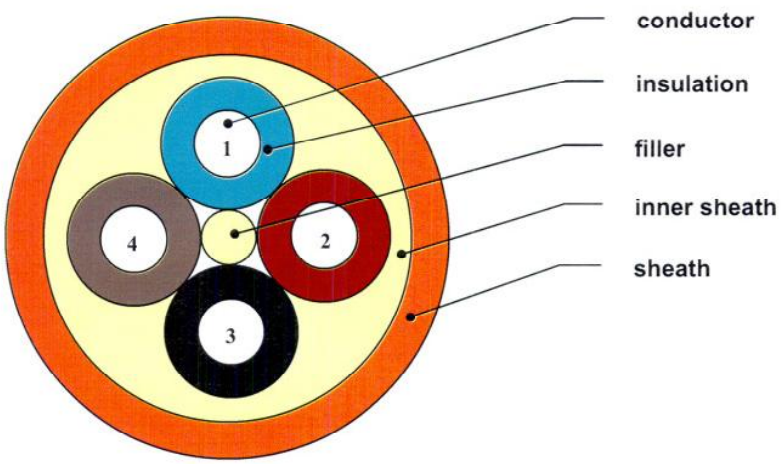
Dátum/Date
12. 09. 2024
Podpis/Signature

Dokument č./Document No. FIRES-FR-129-08-ANNEX

Príloha č./Appendix No. 24

(N)HXH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

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

CONSTRUCTION

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

insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

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

(N)HXH E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5 ÷ 240
5 ÷ 7	1,5 ÷ 70
7 ÷ 10	1,5 ÷ 25
10 ÷ 24	1,5 ÷ 2,5

Operating voltage	0,6/1kV
Voltage test	4000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{14}

Operating temperature range	
during operation	-30°C up to +70°C
during installation	-5°C up to +50°C
Minimum bending radius	15 x D single core 12 x D multi core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0266

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

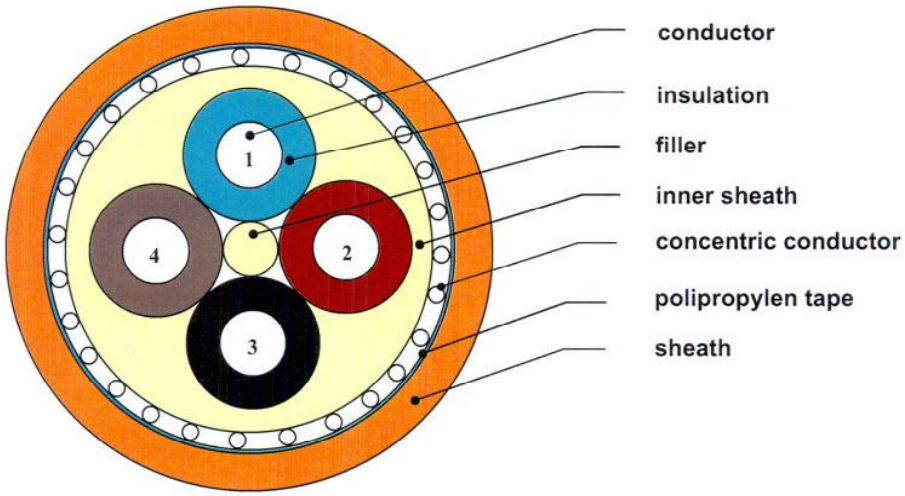
Dátum/Date 12. 04. 2007
Podpis/Signature

Dokument č./Document No. FIRES-FR-129-04-ANNEX

Príloha č./Appendix No. 26

(N)HXCH E90

FIRE RESISTANT HALOGEN FREE POWER CABLES



APPLICATIONS

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

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295
insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266
filler - flame resistant, halogen free polymer compound
inner sheath - flame resistant, halogen free polymer compound
concentric conductor - formed by bare coper wires with counter copper tape
polipropylen tape
sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 12. 09. 2004 Podpis/Signature
Dokument č. Document No. FIRES-FR-129-04-ANNE	
Príloha č./Appendix No. 28	

(N)HXCH E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm^2
1 ÷ 4	1,5/1,5 ÷ 150/70
5 ÷ 7	1,5/1,5 ÷ 4/4
10 ÷ 24	1,5/2,5 ÷ 2,5/10

Operating voltage	0,6/1kV
Voltage test	4000 V, 50 Hz
Insulation resistivity at 20°C, minimum	10^{14}

Operating temperature range during operation during installation	 -30°C up to +70°C -5°C up to +50°C
Minimum bending radius	15 x D single core 12 x D multi core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0266

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

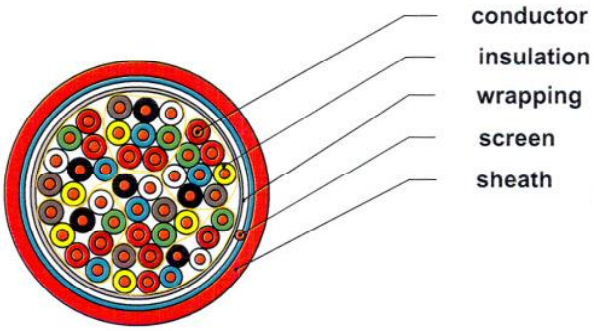
Dátum/Date 12. 04. 2023
Podpis/Signature

Dokument č./Document No. FIRES-FR-129-04-ANJE

Príloha č./Appendix No. 28

JE-H(St)H CERAMIC E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission od signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.
Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to DIN VDE 0295
insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0207-23
wrapping - polipropylen and glass-fibre tape
screen - static screen of plastic coated metal foil with a soild, tinned drain wire
sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0207-5

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 12.09.2008 Podpis/Signature
Dokument č. / Document No. FIRES-FR-29-08 ANNEX	
Príloha č./Appendix No. 29	

JE-H(St)H CERAMIC E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm
1 x 2 x .... 80 x 2 x	0,8
1 x 2 x .... 80 x 2 x	1,0

Operating voltage	225V
Voltage test	
core/core	500 V, 50 Hz
core/screen	2000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{14}

Operating temperature range	
during operation	-30°C up to +70°C
during installation	-5°C up to +50°C
Minimum bending radius	8 x D single core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0815

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

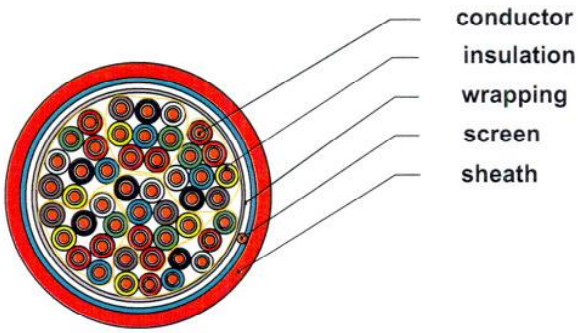
Dátum/Date 12.09.2024
Podpis/Signature

Dokument č./Document No. FIRES- FD- 129-09-ANJE

Príloha č./Appendix No. 30

JE-H(St)H MIKA E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission od signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.
Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to DIN VDE 0295
insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0207-23
wrapping - polipropylen and glass-fibre tape
screen - static screen of plastic coated metal foil with a soild, tinned drain wire
sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0207-5

FIRES s.r.o. POŽIARNA ODOLNOSŤ FIRE RESISTANCE	Dátum/Date 12.08.2008 Podpis/Signature
Dokument č. / Document No. FIRES-FR-129-08-AUVE	
Príloha č./Appendix No. 31	

JE-H(St)H MIKA E90

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm
1 x 2 x .... 80 x 2 x	0,8
1 x 2 x .... 80 x 2 x	1,0

Operating voltage	225V
Voltage test	
core/core	500 V, 50 Hz
core/screen	2000 V, 50 Hz
Insulation resistivity at 90°C, minimum	10^{14}

Operating temperature range	
during operation	-30°C up to +70°C
during installation	-5°C up to +50°C
Minimum bending radius	8 x D single core D = outer diameter
Cable combustibility	
Fire resistance	E90
Combustibility tests	PN-EN 50226:2006, IEC 60332-3
Reference standards	DIN VDE 0815

FIRES s.r.o.
POŽIARNA ODOLNOSŤ
FIRE RESISTANCE

Dátum/Date 12. 04. 2004
Podpis/Signature

Dokument č./Document No. FIRES-FR-109-08-ANNEX

Príloha č./Appendix No. 30