

CLASSIFICATION OF FIRE RESISTANCE FIRES-CR-042-16-AUPE

Power and communication cables of BITNER at cable bearing system BAKS

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CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH DIN 4102-12: 1998-11 with direct field of application

FIRES-CR-042-16-AUPE

Name of the product: Power and communication cables of BITNER at cable bearing system BAKS

Sponsor: Zakłady Kablowe BITNER spółka jawna
ul. Friedleina 3/3
30 009 Kraków
Poland

Prepared by: FIRES, s.r.o.
Osloboditeľov 282
059 35 Batizovce
Slovak Republic

Tested property: Functional resistance in fire
Test method: STN 92 0205: 2014
Type of test: Accredited

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1. INTRODUCTION

This classification report defines the functional resistance in fire classification assigned to element Power and communication cables of BITNER at cable bearing system BAKS in accordance with the procedures given in DIN 4102-12: 1998-11.

Test was carried out according to standard STN 92 0205 and meets requirements of DIN 4102-12: 1998-11. Basic deviation in process and carrying out of test between these standards is in measuring and in control of temperature in the test furnace. According to STN 92 0205, plate thermometers according to EN 1363-1 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1 are used. Measurement by plate thermometers acc. to EN 1363-1 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1. Therefore, it is possible to use results of test according to STN 92 025 for classification of tested cables according to DIN 4102-12: 1998-11, but not conversely. Identified deviation results in stricter course of test and it can lead to reduced classification of tested cables what is accepted as enhanced security in practice.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Power and communication cables of BITNER at cable bearing system BAKS, is defined as a cable bearing system with cables with circuit integrity maintenance classes.

2.2 PRODUCT DESCRIPTION

Product comprise of power and communication halogen free cables of company BITNER at cable bearing system of company BAKS Kazimierz Sielski – cable trays, mesh trays, ladders, cable clamps with accessories (consoles, brackets, supports, hangers, etc.) with circuit integrity maintenance classes.

Cable tray KCP/KCOP

Cable tray is made of steel sheet thickness 1,5 mm. Height of side wall is 60 mm and maximum tested width of cable tray is 600 mm. Trays are fixed together by two junctions LPP/LPOPH60 with nut bolts SGKM6x12 on sides and by junction BL/BLO300 with nut bolts SGKM6x12 on the bottom. Maximum tested loading is 25kg.m⁻¹. Tested tray is KCP/KCOP600H60.

Cable tray KGJ/KGOJ

Cable tray is made of steel sheet thickness 1,0 mm. Height of side wall is 60 mm and maximum tested width of cable tray is 400 mm. Trays are fixed together by nut bolts SGKM6x12. Maximum tested loading is 20kg.m⁻¹. Tested tray is KGJ/KGOJ400H60.

Cable tray KGL/KGOL

Cable tray is made of steel sheet thickness 0,7 mm. Height of side wall is 60 mm and maximum tested width of cable tray is 300 mm. Trays are fixed together by nut bolts SGKM6x12. Maximum tested loading is 20kg.m⁻¹. Tested tray is KGL/KGOL300H60.

Cable tray KBJ

Cable tray is made of steel sheet thickness 1,0 mm without perforation. Height of side wall is 60 mm and maximum tested width of cable tray is 400 mm. Trays are fixed together by nut bolts SGKM6x12. Maximum tested loading is 20kg.m⁻¹. Tested tray is KBJ400H60.

Cable tray KFL

Cable tray is made of steel sheet thickness 0,7 mm. Height of side wall is 60 mm and maximum tested width of cable tray is 300 mm. Trays are fixed together by integrated coupling. Maximum tested loading is 10kg.m⁻¹. Tested trays are KFL50H60 and KFL300H60.

**Cable tray KFJ**

Cable tray is made of steel sheet thickness 1,0 mm. Height of side wall is 60 mm and maximum tested width of cable tray is 400 mm. Trays are fixed together by integrated coupling. Maximum tested loading is 20kg.m⁻¹. Tested tray is KFJ400H60.

Cable mesh tray KDSZ

Cable mesh tray is made of steel wire Ø 4,5 mm. Height of side wall is 60 mm and maximum tested width of cable mesh tray is 400 mm. Mesh trays are fixed together by integrated coupling. Maximum tested loading is 20kg.m⁻¹. Tested mesh tray is KDSZ400H60.

Cable mesh tray KDS/KDSO

Cable mesh tray is made of steel wire Ø 4,0 mm and Ø 4,5 mm. Height of side wall is 60 mm and maximum tested width of cable mesh tray is 400 mm. Mesh trays are fixed together by couplings USSN/USSO. Maximum tested loading is 20kg.m⁻¹. Tested mesh tray KDS/KDSO400H60.

Cable ladder DUP/DUOP

Cable ladder is made of steel sheet thickness 1,5 mm and spacing of transoms is 300 mm. Height of side wall is 60 mm and maximum tested width of cable ladder is 600 mm. Cable ladders are fixed together by two junctions LDC/LDOCH60 and nut bolts SGKM8x14 on sides. Maximum tested loading is 30kg.m⁻¹. Tested ladder is DUP/DUOP600H60.

Cable ladder DUD

Cable ladder is made of steel sheet thickness 1,2 mm and spacing of transoms is 300 mm. Height of side wall is 60 mm and maximum tested width of cable ladder is 400 mm. Cable ladders are fixed together by two junctions LDC/LDOCH60 and nut bolts SGKM8x14 on sides. Maximum tested loading is 20kg.m⁻¹. Tested ladder is DUD400H60.

Cable ladder DFP

Cable ladder is made of steel sheet thickness 1,5 mm and spacing of transoms is 300 mm. Height of side wall is 60 mm and maximum tested width of cable ladder is 400 mm. Cable ladders are fixed together by integrated coupling. Maximum tested loading is 20kg.m⁻¹. Tested ladder is DFP400H60.

Cable clip and clamp

Cable clamp KSA is made of steel sheet 1,2 mm thick.

Single cable clip UDF and double cable clip UDFB are made of steel sheet thickness from 1,2 mm to 2,0 mm.

Cable clips and clamps are used for fixing of cables directly to wall or ceiling.

Support CWP/CWOP40H40

Support CWP/CWOP40H40 with dimensions (40 x 40) mm is made of steel sheet thickness 1,5 mm and is used for installation of trays or ladders.

Support CWP40H22

Support CWP40H22 with dimensions (40 x 22) mm is made of steel sheet thickness 1,5 mm. Support is used for installation of trays or ladders.

Consoles WPCB

Consoles consist of base plate with dimensions (130 x 45 x 5) mm and support with dimensions (50 x 35 x 2) mm. Consoles are used for gripping of brackets to ceiling.

Brackets WWS/WWSO

Brackets are made from steel sheet thickness 2,0 mm. Tested brackets are WWS/WWSO300 and WWS/WWSO400. Brackets are used to gripping trays or ladders to ceiling or to wall.

Spacer BR

Spacer BR55 with dimensions (45 x 140) mm is made of steel sheet 1,5 mm thick. Spacer is used as reinforcement in place of fixing of bracket to console.



Partitions

Partition PGJ is made of steel sheet thickness 1,0 mm.

Partition PGL is made of steel sheet thickness 0,7 mm.

Partition is fixed to cable tray or mesh tray by nut bolts SGKM6x12 or clamping pieces ZS/ZSO and is used for separation of cables.

Partition PGDJ

Partition is made of steel sheet thickness 1,0 mm. Partition is fixed to cable ladder by nut bolts (SR M6x16) and is used for separation of cables.

Connection box PMO1 and PMO2

Connection box is made of steel sheet 1,0 mm thick (bottom part 1,25 mm thick) and is used for cross connection of cables – number of cables and conductors according to type. It can be used inside the buildings on the ceiling or wall.

Cables

Safety power 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.

Halogen-free fire resistant communication cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signaling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

Cables used by test:

Power cables:

(N)HXH FE180/E90 0,6/1kV

BiTflame 1000 FE180/E90 0,6/1kV

BiTservo® FS FE180/E90 0,6/1kV

Communication cables:

HTKSH FE180/PH90/E90 225V

HTKSHekw FE180/PH90/E90 225V

HDGs FE180/PH90/E90 300/500V

HLGs(żo) FE180/PH90 300/500V

HLGsekwf(żo) FE180/PH90 300/500V

The length of cables was 5,2 m and 4,0 m from that was exposed to fire.

More detailed information about product construction is shown in drawings in test report [1].

3. TEST REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	Zakłady Kablowe BITNER sp. j., Kraków, PL	FIRES-FR-029-16-AUNE	11. 02. 2016	STN 92 0205: 2014

[1] Test specimens were conditioned according to EN 1363-1 before the fire resistance test



3.2 TEST RESULTS

No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[1] STN 92 0205: 2014	1	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	18	32 minutes
	2	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		56 minutes
	3	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV 2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	4	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		42 minutes
	5	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	6	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		17
	7	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV	80 minutes	
	8	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV 2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	90 minutes no failure / interruption	
	9	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	90 minutes no failure / interruption	
	10	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	77 minutes	
	12	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	16	
	13	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	14	6 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	20	90 minutes no failure / interruption
	15	6 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	16	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV	15	40 minutes
	17	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		30 minutes
	18	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	14	90 minutes no failure / interruption
	19	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	20	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	21	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	22	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	12	90 minutes no failure / interruption
	23	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	13	90 minutes no failure / interruption
	24	cable (N)HXH 4x1,5RE FE180/E90 0,6/1kV + connection boxes PMO1	10	90 minutes no failure / interruption
	25	cable BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV + connection boxes PMO1	9	32 minutes
	26	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	27	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	28	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	8	38 minutes
	30	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	31	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV	7	90 minutes no failure / interruption
	32	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	33	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	6	90 minutes no failure / interruption
	34	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		36 minutes
	35	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	5	90 minutes no failure / interruption
	36	2 cables (N)HXH 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
	37	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV	4	83 minutes
	38	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		37 minutes
	39	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	3	30 minutes
	40	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		62 minutes
	41	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
	42	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption



No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor	
[1] STN 92 0205: 2014	43	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	2	37 minutes	
	44	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		78 minutes	
	45	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption	
	46	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption	
	47	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	1	42 minutes	
	48	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		90 minutes no failure / interruption	
	49	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption	
	50	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		75 minutes	
	51	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV 2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	19	90 minutes no failure / interruption	
	52	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	18	90 minutes no failure / interruption	
	53	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	54	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	17	49 minutes	
	55	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		63 minutes	
	56	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	16	90 minutes no failure / interruption	
	57	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	58	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	15	90 minutes no failure / interruption	
	59	2 cables HLGs(žo) 2x1,0 FE180/PH90 300/500V		30 minutes	
	60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	61	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	13	90 minutes no failure / interruption	
	62	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	12	90 minutes no failure / interruption	
	63	A	cable HDGs 2x1,0 FE180/PH90/E90 300/500V + connection boxes PMO1	11	88 minutes
		B	cable HTKSH 1x2x0,8 FE180/PH90/E90 225V + connection boxes PMO1	8	49 minutes
	64	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	9	28 minutes	
	65	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	8	90 minutes no failure / interruption	
	66	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	7	90 minutes no failure / interruption	
67	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	78 minutes			
68	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	6	90 minutes no failure / interruption		
69	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption		
70	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	5	90 minutes no failure / interruption		
71	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption		
72	2 cables HLGs(žo) 2x1,0 FE180/PH90 300/500V	4	63 minutes		
73	2 cables HLGs(žo) 2x1,0 FE180/PH90 300/500V	3	49 minutes		
74	2 cables HLGsekwf(žo) 2x1,0 FE180/PH90 300/500V	2	90 minutes no failure / interruption		
75	2 cables HLGs(žo) 2x1,0 FE180/PH90 300/500V	1	77 minutes		

[1] The fire test was terminated in the 94th minute upon request of test sponsor

Specimens S1 – S51 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.

Circuit breakers with rating 3 A were used.



4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 3.2 of DIN 4102-12: 1998-11.

4.2 CLASSIFICATION

The element, **Power and communication cables of BITNER at cable bearing system BAKS**, is classified according to the following combinations of performance parameters and classes as appropriate.

Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable	
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	Cable tray KGJ/KGOJ400H60 with partition PGJ60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 1.	E 60	n x ≥ 1,5 mm ² n ≥ 2	
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		E 90	E 60	
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		E 30	n x ≥ 1,5 mm ² n ≥ 2	
	BiTservo® FS 4G50 FE180/E90 0,6/1kV		E 90		E 30
HLGs(žo) FE180/PH90 300/500V	HLGs(žo) 2x1,0 FE180/PH90 300/500V			E 60	n x ≥ 1,0 mm ² n ≥ 2 E 60
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		Cable mesh tray KDSZ400H60 with partition PGL50. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 2.	E 90	n x ≥ 1,5 mm ² n ≥ 2
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV			E 90	
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV			E 30	n x ≥ 1,5 mm ² n ≥ 2
	BiTservo® FS 4G50 FE180/E90 0,6/1kV			E 60	
HLGsekwf(žo) FE180/PH90 300/500V	HLGsekwf(žo) 2x1,0 FE180/PH90 300/500V				E 90
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	Cable ladder DUD400H60 with partition PGDJ40. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 3.		E 90	n x ≥ 1,5 mm ² n ≥ 2
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV			E 90	
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV			E 30	n x ≥ 1,5 mm ² n ≥ 2
	BiTservo® FS 4G50 FE180/E90 0,6/1kV			E 60	
HLGs(žo) FE180/PH90 300/500V	HLGs(žo) 2x1,0 FE180/PH90 300/500V				E 30
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		Cable tray KGL/KGOL300H60 with partition PGL60. Consoles combined of supports CWP40H22 and threaded rods PGM12. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 4.	E 30	n x ≥ 1,5 mm ² n ≥ 2
	BiTservo® FS 4G50 FE180/E90 0,6/1kV			E 60	
HLGs(žo) FE180/PH90 300/500V	HLGs(žo) 2x1,0 FE180/PH90 300/500V			E 60	n x ≥ 1,0 mm ² n ≥ 2
				E 60	



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable mesh tray KDS/KDSO400H60 with partition PGL50. Consoles combined of supports CWP40H22 and threaded rods PGM12. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 5.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 90	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable ladder DFP400H60 with partition PGDJ40. Consoles combined of supports CWP40H22 and threaded rods PGM12. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 6.	E 30	n x ≥ 1,5 mm ² n ≥ 2 E 30
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 90	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable ladder DUD400H60 with partition PGDJ60. Ladders fixed to steel plates ¹⁾ conversely by supports CWP/CWOP40H40, fastening brackets UTM/UTMO and clamps UDC. Cables fixed to ladders by cable clamps UK1/UKO1. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 7.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 90	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 60	n x 2 x ≥ 0,8 mm n ≥ 1 E 60
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable tray KFL300H60 with partition PGL60. Consoles WPCB1000, brackets WWS/WWSO300, spacers BR55. Connection boxes PMO1 are fixed directly to cable tray side. Loading 10kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 8 and 9.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 30
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 30	
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		E 90	
	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV + connection boxes PMO1		E 30	Without classification
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
HTKSHekw FE180/PH90 E90 225V	HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		Without classification	Without classification
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V + connection boxes PMO1		E 30	n x 2 x ≥ 0,8 mm n ≥ 1 E 30

¹⁾ Supporting construction is made of segments (approx. 150 mm long) of steel profiles (I 80) with steel plate 10 mm thick welded to bottom flange of profile. Individual segments are fixed to ceiling longitudinal.



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV + connection boxes PMO1	Support CWP/CWOP40H40 fixed to bottom flange of steel profiles ²⁾ by beam clamp ZK8/19 and threaded rod PGM6 in spacing of 1500 mm. Additional load 3,5kg. Connection boxes PMO1 are fixed directly to support. Tracks No. 10 and 11.	E 90	Without classification	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V + connection boxes PMO1		E 60	n x ≥ 1,0 mm ² n ≥ 2 E 60	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable tray KFL50H60 fixed to bottom flange of steel profiles ²⁾ by beam clamp ZK8/19, threaded rod PGM6 and hanger (WC50). Loading 5kg.m ⁻¹ . Spacing of fixing 1500 mm. Tracks No. 12 and 13.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90	
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV (N)HXH 4x50RM FE180/E90 0,6/1kV		E 90 E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	Cable tray KFJ400H60 with partition PGJ60. Consoles combined of supports CWP40H22 and threaded rods PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 14 and 15.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		E 30	n x ≥ 1,5 mm ² n ≥ 2 E 30	
	BiTservo® FS 4G50 FE180/E90 0,6/1kV		E 30	n x ≥ 1,0 mm ² n ≥ 2 E 90	
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 30	
HLGs(zo) FE180/PH90 300/500V	HLGs(zo) 2x1,0 FE180/PH90 300/500V		E 30	n x 2 x ≥ 0,8 mm n ≥ 1 E 90	
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		Cable tray KBJ400H60. Consoles combined of supports CWP/CWOP40H40 and threaded rods PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 16.	E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
	(N)HXH 4x50RM FE180/E90 0,6/1kV			E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V			E 90	n x 2 x ≥ 0,8 mm n ≥ 1 E 90
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V	E 90			

²⁾ Supporting construction is made of segments (approx. 200 mm long) of steel profiles (I 80) fixed to ceiling transverse



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections and number of conductors)	Classification for cable	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable tray KCP/KCOP600H60 with partition PGL60. Consoles combined of supports CWP/CWOP40H40 and threaded rods PGM10. Loading 25kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 17.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
	(N)HXH 4x50RM FE180/E90 0,6/1kV		E 90		
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		E 60	n x ≥ 1,5 mm ² n ≥ 2 E 60	
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV		E 90		
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		E 30	n x ≥ 1,5 mm ² n ≥ 2 E 30	
	BiTservo® FS 4G50 FE180/E90 0,6/1kV		E 60		
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V		E 60	n x ≥ 1,0 mm ² n ≥ 2 E 60	
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V		E 30	n x 2 x ≥ 0,8 mm n ≥ 1 E 30	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		Cable ladder DUP/DUOP600H60 with partition PGDJ60. Consoles combined of supports CWP/CWOP40H40 and threaded rods PGM10. Loading 30kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 18.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXH 4x50RM FE180/E90 0,6/1kV			E 90	
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV			E 90	n x ≥ 1,5 mm ² n ≥ 2 E 30
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV			E 30	
BiTservo® FS FE180/E90 0,6/1kV	BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	E 30		n x ≥ 1,5 mm ² n ≥ 2 E 30	
	BiTservo® FS 4G50 FE180/E90 0,6/1kV	E 30			
HDGs FE180/PH90 E90 300/500V	HDGs 2x1,0 FE180/PH90/E90 300/500V	E 90		n x ≥ 1,0 mm ² n ≥ 2 E 90	
HTKSH FE180/PH90 E90 225V	HTKSH 1x2x0,8 FE180/PH90/E90 225V	E 90		n x 2 x ≥ 0,8 mm n ≥ 1 E 90	
BiTflame 1000 FE180/E90 0,6/1kV	BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	Single cable clips UDF fixed to ceiling in spacing of 600 mm. Track No. 19.		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	BiTflame 1000 4x50RM FE180/E90 0,6/1kV			E 90	
(N)HXH FE180/E90 0,6/1kV	(N)HXH 4x1,5RE FE180/E90 0,6/1kV	Cable clamps KSA fixed to ceiling in spacing of 600 mm. (3 cables at one clamp) Track No. 20.		E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXH 4x50RM FE180/E90 0,6/1kV			E 90	

The element, Power and communication cables of BITNER at cable bearing system BAKS with circuit integrity maintenance classes are classified to classes according to achieved test results of tested cables at tracks. Other classification is not allowed.



4.3 FIELD OF APPLICATION

This classification is valid according to standard for the following end use applications:

- throughout the period during which circuit integrity is to be maintained, neighbouring building components shall not have a negative effect on circuit integrity;
- although testing is only carried out on cables arranged horizontally, test results also apply to cables arranged either diagonally or vertically (e.g. risers), as long as the cable system is supported in transitional areas (i.e. where it switches from a horizontal to a vertical arrangement) in such a manner that the cables will not slip or kink at corners;
- if the standard support construction specified here is used for testing, test results also apply to other types of tested support construction;
- where risers are used, circuit integrity classification only applies if the cable is effectively supported (i.e. with a spacing of supports of 3500 mm or less). Cables may also be stabilized by a seal at penetrations in floors, provided that the sealant material is of a suitable material class, or using clips of proven suitability. The suitability of any design other than that shown in DIN 4102-12, figure 5 may only be assessed by an accredited test laboratory;
- for vertical systems, the test results obtained for cables mounted singly on the ceiling using single clips apply. In practice, brackets of proven suitability may also be used, as long as their spacing is equal to that of the single clips tested;
- results of testing single cables on the ceiling apply also to cables mounted horizontally on walls;
- results of testing bunched cables on a ladder or tray also apply to support construction attached to a wall as shown in DIN 4102-12, figure 6. However, such constructions require proof of suitability by means of a test certificate or other document issued by an accredited testing laboratory.

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid provided that the product, field of application and standards and regulations are not changed.

Approved:

Signed:

Ing. Štefan Rástocký
leader of the testing laboratory



Bc. Dávid Šubert
technician of the testing laboratory