

CLASSIFICATION OF FIRE RESISTANCE FIRES-CR-018-16-AUPE

Power and communication cables of Technokabel S.A. 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-018-16-AUPE

Name of the product: Power and communication cables of Technokabel S.A. at cable bearing system BAKS

Sponsor: Technokabel S.A.
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Poland

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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 Technokabel S.A. 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 Technokabel S.A. 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 Technokabel S.A. 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/BLO with nut bolts SGKM6x12 on the bottom. Maximum tested loading is $25\text{kg}\cdot\text{m}^{-1}$. Tested trays are KCP/KCOP300H60-E and KCP/KCOP600H60.

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 $20\text{kg}\cdot\text{m}^{-1}$. Tested tray is KGL/KGOL300H60.

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 $20\text{kg}\cdot\text{m}^{-1}$. Tested tray is KFJ400H60.

Cable trays 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 50 mm. Trays are fixed together by integrated coupling. Maximum tested loading is $5\text{kg}\cdot\text{m}^{-1}$. Tested tray is KFL50H60.

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 $30\text{kg}\cdot\text{m}^{-1}$. Tested ladder is DUP600H60.

**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 SGK M8x14 on sides. Maximum tested loading is 20kg.m⁻¹. Tested ladder is DUD300H60 and 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 ladders are DFP300H60 and DFP400H60.

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 trays is KDS/KDSO60H60 and KDS/KDSO400H60.

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 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.

Beam clip ZSK1 is made of steel sheet 1,0 mm thick and used for fixing of cables to open sections.

Cable hanger

Cable hanger OZ/OZO with dimensions (100 x 120 x 82) mm is made of steel sheet thickness 1,5 mm.

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.

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.

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.

Spacer BR

Spacers BR55 with dimensions (42 x 140) mm are made of steel sheet 1,5 mm thick. Spacers are used as reinforcement in place of fixing of brackets.

Partition PGL

Partition is made of steel sheet thickness 0,7 mm. Partition is fixed to cable tray or mesh tray by nut bolts (SGK M6x12) 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

Fire resistant power cables, insulated and sheathed with halogen free compounds, are intended for power supply to fire protection equipment which is to operate in fire conditions (e.g. water pumps in fire extinguishing systems, smoke removing fans).

Fire resistant and halogen free communication cables are intended for installation in alarm, signaling, transmission, sound warning and similar systems, also for data processing systems and for analogue or digital data transmission in industrial electronics and control applications in objects of sharp fire protection requirements, particularly in fire alarm and fire automatic control systems.

Halogen free cables shall be applied in locations where, in case of fire, higher safety for human beings and expensive electronic equipment is required. Functions of the cables are maintained – data are transmitted and power is supplied to equipment which must operate in fire conditions and during fire fighting (e.g. emergency lighting, smoke removing fans). The cables are flame retardant and their smoke emission is low, emitted fumes are non-toxic and non-corrosive. The cables are suitable for indoor and outdoor installations.

Cables used by test:

Power cables:

NHXH-J FE180 PH90/E90 0.6/1 kV
 NHXH-J FE180 PH90/E90 B2cas1d0 0.6/1 kV
 (N)HXCH FE180 PH90/E90 0.6/1 kV
 (N)HXH-J FE180 PH30/E30 0.6/1 kV
 (N)HXH-J FE180 PH90/E90 0.6/1 kV
 (N)HXCH-J-SERVO FE180 PH90/E90 0.6/1 kV
 (N)HXCH-J-SERVO-W FE180 PH90/E90 0.6/1 kV

Communication cables:

HTKSH FE180 PH90/E30-E90 240 V
 HDGs FE180 PH90/E30-E90 300/500 V
 HDGszo-W FE180 PH90/E30-E90 300/500 V
 HDGs FE180 PH90/E30-E90 300/500 V

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 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	Technokabel S.A., Warszawa, PL	FIRES-FR-018-16-AUNE	28. 01. 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 (N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	13	27 minutes
	2	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		36 minutes
	3	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	12	90 minutes no failure / interruption
	4	2 cables (N)HXCH-J-SERVO-W FE180 PH90/E90 4x1.5 RE 0.6/1 kV		79 minutes
	5	2 cables (N)HXCH-J-SERVO-W FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	6	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		27 minutes
	7	cable NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV + connection boxes PMO2	11	89 minutes
	8	cable NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV + connection boxes PMO1		65 minutes
	9	2 cables (N)HXCH-J-SERVO-W FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	10	2 cables (N)HXCH-J-SERVO-W FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	11	2 cables (N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	10	90 minutes no failure / interruption
	12	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		26 minutes
	13	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	9	90 minutes no failure / interruption
	14	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	15	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV	8	90 minutes no failure / interruption
	16	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	17	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		55 minutes
	18	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		78 minutes
	19	2 cables (N)HXH-J FE180 PH90/E90 4x16 RM 0.6/1 kV	21	71 minutes
	20	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	21	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV	20	70 minutes
	22	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	23	2 cables (N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	7	51 minutes
	24	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		43 minutes
	25	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		67 minutes
	26	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		38 minutes
	27	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	6	90 minutes no failure / interruption
	28	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		81 minutes
	29	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		49 minutes
	30	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		48 minutes
	31	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	32	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	33	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	5	45 minutes
	34	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	35	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	4, 4a	22 minutes
	36	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		13 minutes
	37	6 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	18	90 minutes no failure / interruption
	38	6 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	39	6 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		15 minutes
	40	6 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		39 minutes



No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
	41	cable HDGs FE180 PH90/E30-E90 3x1.5 mm ² 300/500V (230V) + connection boxes PMO1	17	90 minutes no failure / interruption
[1] STN 92 0205: 2014	42	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	15, 15a	90 minutes no failure / interruption
	43	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	44	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	3	90 minutes no failure / interruption
	45	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		67 minutes
	46	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	2	31 minutes
	47	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		88 minutes
	48	2 cables NHXH-J FE180 PH90/E90 B2cas1d0 4x1.5 RE 0.6/1 kV	1	90 minutes no failure / interruption
	49	2 cables NHXH-J FE180 PH90/E90 B2cas1d0 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	50	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	14	90 minutes no failure / interruption
	51	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	52	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	12	80 minutes
	53	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	11	90 minutes no failure / interruption
	54	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	21	90 minutes no failure / interruption
	55	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		90 minutes no failure / interruption
	56	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	10	59 minutes
	57	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	8	44 minutes
	58	2 cables HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V	20	90 minutes no failure / interruption
	59	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	7	56 minutes
	60	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		68 minutes
	61	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	6	90 minutes no failure / interruption
	62	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		90 minutes no failure / interruption
	63	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V	5	90 minutes no failure / interruption
	64	2 cables HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		90 minutes no failure / interruption
	65	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	4a	90 minutes no failure / interruption
	66	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V	4	90 minutes no failure / interruption
67	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	19	90 minutes no failure / interruption	
68	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	15a	90 minutes no failure / interruption	
69	2 cables HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V	15	84 minutes	
70	2 cables HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V	3	57 minutes	
71	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		39 minutes	
72	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	2	81 minutes	
73	2 cables HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V	1	90 minutes no failure / interruption	
74	2 cables HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		90 minutes no failure / interruption	
75	2 cables HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V	14	90 minutes no failure / interruption	

[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 Technokabel S.A. 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
NHXH FE180 PH90/E90 B2cas1d0 0,6/1 kV	NHXH-J FE180 PH90/E90 B2cas1d0 4x1.5 RE 0.6/1 kV	Cable tray KCP/KCOP300H60-E with partition PGL60-E. Consoles combined of head plate PSU-E, support CWP/CWOP40H40-E reinforced by spacer BR40-E, brackets WWS/WWSO300-E, threaded rod grip UPW/UPWO-E fixed on the opposite end of bracket, threaded rod PGM10-E and ceiling holder UTS-E. Loading 10kg.m ⁻¹ . Consoles in spacing of 1200 mm. Track No. 1.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXH-J FE180 PH90/E90 B2cas1d0 4x50 RM 0.6/1 kV		E 90	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 90	n x 2 x ≥ 1,0 mm n ≥ 1 E 90
HDGszo-W FE180 PH90/E30-E90 300/500V	HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		E 90	n x ≥ 1,0 mm ² n ≥ 3 E 90
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable ladder DFP300H60. Consoles WPCB700 reinforced by spacers BR55, brackets WWS/WWSO300. Loading 10kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 2.	E 60	n x ≥ 1,5 mm ² n ≥ 2 E 30
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		E 30	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	E 60	n x 2 x ≥ 1,0 mm n ≥ 1 E 60	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable tray KGL/KGOL300H60. Consoles WPCB700 reinforced by spacers BR55, brackets WWS/WWSO300. Loading 10kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 3.	E 60	n x ≥ 1,5 mm ² n ≥ 2 E 60
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		E 90	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 30	n x 2 x ≥ 1,0 mm n ≥ 1 E 30
HDGszo-W FE180 PH90/E30-E90 300/500V	HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		E 30	n x ≥ 1,0 mm ² n ≥ 3 E 30
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable mesh tray KDS/KDSO60H60. Consoles combined of supports CWP/CWOP40H40 and threaded rods PGM10. Loading 3kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 4 and 4a.	Without classification	Without classification
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		Without classification	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	E 90	n x 2 x ≥ 1,0 mm n ≥ 1 E 90	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V	E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90	



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 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable mesh tray KDSZ400H60. Consoles combined of supports CWP/CWOP40H40 and threaded rods PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 5.	E 90	n x ≥ 1,5 mm ² n ≥ 2	
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		E 30	E 30	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		E 90	n x ≥ 1,0 mm ² n ≥ 2 E 90	
HDGszo-W FE180 PH90/E30-E90 300/500V	HDGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		E 90	n x ≥ 1,0 mm ² n ≥ 3 E 90	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		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. 6.	E 90	n x ≥ 1,5 mm ² n ≥ 2
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV			E 90	E 90
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV			E 60	n x ≥ 1,5 mm ² n ≥ 2
	(N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV			E 90	E 60
(N)HXCH-J-SERVO FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	E 30		n x ≥ 1,5 mm ² n ≥ 2	
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV	E 30		E 30	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	E 90		n x 2 x ≥ 1,0 mm n ≥ 1 E 90	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V	E 90		n x ≥ 1,0 mm ² n ≥ 2 E 90	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	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. 7.		E 30	n x ≥ 1,5 mm ² n ≥ 2
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV			E 60	E 30
(N)HXH FE180 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV		E 30	n x ≥ 1,5 mm ² n ≥ 2	
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		E 30	E 30	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 30	n x 2 x ≥ 1,0 mm n ≥ 1 E 30	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		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)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	Cable tray KFJ400H60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 8.	E 60	n x ≥ 1,5 mm ² n ≥ 2 E 60	
	(N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		E 90		
(N)HXCH-J-SERVO FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		E 30	n x ≥ 1,5 mm ² n ≥ 2 E 30	
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		E 90		
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 30	n x 2 x ≥ 1,0 mm n ≥ 1 E 30	
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		Cable mesh tray KDSZ400H60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 9.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV			E 90	
(N)HXH FE180 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV		Cable ladder DFP400H60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 10.	E 90	Without classification
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV			Without classification	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V			E 30	n x 2 x ≥ 1,0 mm ² n ≥ 1 E 30
(N)HXCH-J-SERVO-W FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO-W FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable tray KGL/KGOL300H60 with partition PGL60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Connection boxes PMO1 and PMO2 fixed directly to cable tray side. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 11.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90	
	(N)HXCH-J-SERVO-W FE180 PH90/E90 4x50 RM 0.6/1 kV		E 90		
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV + connection boxes PMO1		E 60	Without classification	
	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV + connection boxes PMO2		E 60	Without classification	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 90	n x 2 x ≥ 1,0 mm n ≥ 1 E 90	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		Cable mesh tray KDS/KDSO400H60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Loading 20kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 12.	E 90	Without classification
	(N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV			Without classification	
(N)HXCH-J-SERVO-W FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO-W FE180 PH90/E90 4x1.5 RE 0.6/1 kV			E 60	n x ≥ 1,5 mm ² n ≥ 2 E 60
	(N)HXCH-J-SERVO-W FE180 PH90/E90 4x50 RM 0.6/1 kV	E 90			
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	E 60		n x 2 x ≥ 1,0 mm n ≥ 1 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 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	Cable ladder DUD400H60. Consoles WPCB1000, brackets WWS/WWSO400, threaded rod grip UPW/UPWO fixed on the opposite end of bracket, threaded rod PGM10. Loading 25kg.m ⁻¹ . Consoles in spacing of 1500 mm. Track No. 13.	Without classification	Without classification
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		E 30	
(N)HXCH-J- SERVO FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Single cable clips UDF fixed to ceiling in spacing of 600 mm. Track No. 14.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		E 90	
HdGszo-W FE180 PH90/E30-E90 300/500V	HdGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		E 90	n x ≥ 1,0 mm ² n ≥ 3 E 90
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable tray KFL50H60. Trays fixed to bottom flange of steel profile I80 by hanger WC50, threaded rod PGM6 and beam clamp ZK8/19. Loading 5kg.m ⁻¹ . Consoles in spacing of 1500 mm. Tracks No. 15 and 15a.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 90
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		E 90	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 90	n x 2 x ≥ 1,0 mm n ≥ 1 E 90
HdGs FE180 PH90/E30-E90 300/500V	HdGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		E 60	n x ≥ 1,0 mm ² n ≥ 2 E 60
HdGs FE180 PH90/E30-E90 300/500V	HdGs FE180 PH90/E30-E90 3x1,5mm ² 300/500 V + connection boxes PMO1 (230V)	Support CWP/CWOP40H40 fixed to bottom flange of steel profile I80 by beam clamp ZK8/19 and threaded rod PGM8 in spacing of 1500 mm. Additional load 3,5kg. Connection boxes are fixed directly to support. Track No. 17.	E 90	Without classification
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable clamps KSA fixed to ceiling by threaded rods PGM6 and internally threaded wedge anchors (TRSOM6) in spacing of 600 mm. (3 cables at one clamp) Track No. 18.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 30
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		E 30	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		E 90	Without classification
	(N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		Without classification	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V	Support CWP/CWOP40H40 fixed to steel sheets ¹⁾ by self-drilling screws SMD 4,8 x 16. Cable clips UDF are fixed to supports by self-drilling screws SMD 4,8 x 16 in spacing of 600 mm. Track No. 19.	E 90	n x 2 x ≥ 1,0 mm n ≥ 1 E 90
(N)HXCH-J- SERVO FE180 PH90/E90 0,6/1 kV	(N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable hangers OZO fixed to ceiling in spacing of 600 mm. Track No. 20.	E 90	n x ≥ 1,5 mm ² n ≥ 2 E 60
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		E 60	
HdGszo-W FE180 PH90/E30-E90 300/500V	HdGszo-W FE180 PH90/E30-E90 3x1mm ² 300/500 V		E 90	n x ≥ 1,0 mm ² n ≥ 3 E 90

¹⁾ Supporting construction made of segments of steel sheet 2,0 mm thick bent to trapezoidal wave.



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 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cables are fixed to steel plates ²⁾ by beam clips ZSK1 in spacing of 600 mm. Track No. 21.	E 90	$n \times \geq 1,5-16 \text{ mm}^2$ $n \geq 2$ E 60
	(N)HXH-J FE180 PH90/E90 4x16 RM 0.6/1 kV		E 60	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x1.0 mm 240 V		E 90	$n \times 2 \times \geq 1,0 \text{ mm}$ $n \geq 1$ E 90
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1mm ² 300/500 V		E 90	$n \times \geq 1,0 \text{ mm}^2$ $n \geq 2$ E 90

²⁾ Supporting construction is made of consoles to which are welded steel plates 5,0 mm thick.

The element, Power and communication cables of Technokabel S.A. 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:

Ing. Štefan Rástocký
leader of the testing laboratory



Signed:

Bc. Dávid Šubert
technician of the testing laboratory