CLASSIFICATION OF FUNCTIONAL RESISTANCE
FIRES-CR-050-17-AUPE

Power and communication cables of Technokabel S.A. at cable supporting system BAKS

Reg. No. 041/S-159

The Experts on Fire Safety

CLASSIFICATION OF FUNCTIONAL RESISTANCE IN FIRE IN ACCORDANCE WITH DIN 4102-12: 1998-11

with direct field of application

FIRES-CR-050-17-AUPE

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

Sponsor:
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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 supporting 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 0205 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 supporting system BAKS, is defined as a cable supporting 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 supporting system of company BAKS – cable trays, mesh trays, ladders and accessories (consoles, brackets, supports, hangers, etc.).

Cable supporting system:

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 400 mm. Trays are fixed together by two connectors (LPP/LPOPH60, steel sheet thickness 1,5 mm) with nut bolts (SGKM6x12) on sides and by joint plate (BL/BLO, steel sheet thickness 1,0 mm) with nut bolts (SGKM6x12) on the bottom. Maximum tested loading is 20kg.m^{-1}. Tested tray is KCP/KCOP400H60E.

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 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 KBL
Cable tray is made of steel sheet thickness 0,7 mm without perforation. 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 10kg.m^{-1}. Tested tray is KBJ300H60.

Cable mesh tray KDS/KDSO
Cable mesh tray is made of steel wire either ∅ 4,0 mm or ∅ 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 connectors (USSN/USSO). Maximum tested loading is 20kg.m^{-1}. Tested mesh trays are 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 400 mm. Cable ladders are fixed together by two connectors (LDC/LDOCH60, steel sheet thickness 1,5 mm) with nut bolts (SGKM8x14) on sides. Maximum tested loading is 20kg.m^{-1}. Tested ladder is DUP/DUOP400H60E.

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 connectors (LDC/LDOCH60, steel sheet thickness 1,5 mm) with nut bolts (SGKM8x14) on sides. Maximum tested loading is 20kg.m^{-1}. Tested ladder is DUD400H60.

Cable clip
Single cable clip UDF is made of steel sheet thickness either 1,2 mm or 2,0 mm. Cable clips are used for fixing of cables directly to wall or ceiling.

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

Brackets
Bracket (WWS/WWSO) is made of bent steel sheet thickness 2,0 mm. Tested brackets are WWS/WWSO400E and WWS/WWSO500.

Bracket (WMCN) is made of head plate with dimensions (40 x 75 x 3) mm and bent steel sheet 1,5 mm thick welded together. Tested bracket is WMCN300.

Head plate – variable PSUN/PSUNO
Head plate with dimensions (180 x 100 x 45) mm is made of bent steel sheet 2,0 mm thick and is used for adjustable fixing of supports (CW…, CM…) to ceiling.

Consoles WPCW/WPCO
Consoles consist of base plate with dimensions (150 x 80 x 5) mm and support with dimensions (40 x 40 x 2) mm. Consoles are used for gripping of brackets to ceiling or floor.

Spacer BR
Spacer BR40 with dimensions (35 x 15 x 100) mm is made of steel sheet 1,5 mm thick. Spacer is used as reinforcement of console in place of fixing of bracket.

Individual parts of supporting systems are made of galvanized steel, according to Sendzimir method PN-EN 10-346 and PN-EN ISO 1461 or of stainless steel. Detailed information about used materials are specified in table of clause 4.2.

<u>Cables:</u>
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.

Cable connection TKM/E90
Connection of cables is realized by producer of cables and is used to restore of damaged/torn cables. Peeled ends of cable conductors are jointed together by copper connector (diameter acc. to cable cross-section) and insulated with mica tapes and with heat-shrink tubes.

Cables used by test:

Power cables:
NHXH FE180 PH90/E90 0.6/1 kV
(N)HXH FE180 PH90/E90 0.6/1 kV
NHXCH FE180 PH90/E90 0.6/1 kV
(N)HXCH-J-SERVO FE180 PH90/E90 0.6/1 kV

Communication cables:
HTKSH FE180 PH90/E30-E90 240V
HTKSHekw FE180 PH90/E30-E90 240V
HDGs FE180 PH90/E30-E90 300/500 V
HDGs-W 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 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	Technokabel S.A., Warszawa, PL	FIRES-FR-037-17-AUNE	23. 02. 2017	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 NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	**13**	90 minutes no failure / interruption
	2	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		51 minutes
	3	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	**12**	33 minutes
	4	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		55 minutes
	5	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV **+ cable connection TKM/E90-4x1.5/1.5**	**11**	69 minutes
	6	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV **+ cable connection TKM/E90-4x50/25**		77 minutes
	7	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		81 minutes
	8	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		47 minutes
	9	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV **+ cable connection TKM/E90-4x50**	**10**	90 minutes no failure / interruption
	10	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV **+ cable connection TKM/E90-4x1.5**		64 minutes
	11	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**9**	90 minutes no failure / interruption
	12	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		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	13	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**7.1**	44 minutes
	14	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	15	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**6.1**	90 minutes no failure / interruption
	16	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	17	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**5.1**	90 minutes no failure / interruption
	18	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	19	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV	**8**	78 minutes
	20	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV		40 minutes
	21	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**7**	90 minutes no failure / interruption
	22	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	23	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**6**	90 minutes no failure / interruption
	24	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	25	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	**5**	90 minutes no failure / interruption
	26	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	27	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	**14**	90 minutes no failure / interruption
	28	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		53 minutes
	29	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	30	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	31	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV	**4**	90 minutes no failure / interruption
	32	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV		56 minutes
	33	6 cables NHXH FE180 PH90/E90 1x240 RM 0.6/1 kV	**3**	90 minutes no failure / interruption
	34	6 cables NHXH FE180 PH90/E90 1x16 RE 0.6/1 kV		90 minutes no failure / interruption
	35	6 cables NHXH FE180 PH90/E90 1x16 RE 0.6/1 kV	**2**	90 minutes no failure / interruption
	36	6 cables NHXH FE180 PH90/E90 1x240 RM 0.6/1 kV		90 minutes no failure / interruption
	37	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	**1**	90 minutes no failure / interruption
	38	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	39	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	40	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	52	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**10**	62 minutes
	53	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**9**	90 minutes no failure / interruption
	54	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**8.1**	90 minutes no failure / interruption
	55	2 cables HDGs FE180 PH90/E30-E90 2x1 mm2 300/500 V		90 minutes no failure / interruption
	56	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	57	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	58	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**7.1**	90 minutes no failure / interruption
	59	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**6.1**	90 minutes no failure / interruption
	60	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**5.1**	90 minutes no failure / interruption
	61	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**7**	90 minutes no failure / interruption
	62	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**6**	90 minutes no failure / interruption
	63	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**5**	90 minutes no failure / interruption
	64	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**4**	47 minutes

Specimens S1 – S40 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S64 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

Circuit breakers with rating 3 A were used.

[1] The test was discontinued in 94th minute at the request of test sponsor

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 supporting 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 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable tray KCP/KCOP400H60E. Consoles combined of variable ceiling hanger PSUN/PSUNO E and support CWP/CWOP40H40 E. Brackets WWS/WWSO400 E, spacers BR40 E, rod grips UPW E, threaded rods PGM10 E, ceiling hangers WPPG E and anchors PSROM10/90 E. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Track No. 1.**	**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**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		**E 90**	n x ≥ 1,5 mm^2 n ≥ 2 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		**E 90**	
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 1x16 RM 0.6/1 kV	Cable ladder DUP/DUOP400H60E. Consoles combined of variable ceiling hanger PSUN/PSUNO E and support CWP/CWOP40H40 E. Brackets WWS/WWSO400 E, spacers BR40 E, rod grips UPW E, threaded rods PGM10 E, ceiling hangers WPPG E and anchors PSROM10/90 E. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Track No. 2.**	**E 90**	1 x ≥ 16 mm^2 **E 90**
	NHXH-J FE180 PH90/E90 1x240 RM 0.6/1 kV		**E 90**	
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 1x16 RM 0.6/1 kV	Cable tray KBJ400H60. Consoles combined of support CWP/CWOP40H40 and two threaded rods PGM8 are fixed to ceiling by anchors TRSOM8. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Track No. 3.**	**E 90**	1 x ≥ 16 mm^2 **E 90**
	NHXH-J FE180 PH90/E90 1x240 RM 0.6/1 kV		**E 90**	
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	Cable tray KBL300H60. Brackets WMCN300 fixed to wall. Loading 10kg.m^{-1}. Brackets in spacing of 1500 mm. **Track No. 4.**	**E 30**	n x ≥ 1,5 mm^2 n ≥ 2 **E 30**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 30**	n x 2 x ≥ 0,8 mm n ≥ 1 **E 30**

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 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable tray KGJ/KGOJ400H60. Consoles WPCW/WPCO fixed to floor, brackets WWS/WWSO400, spacers BR40. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Tracks No. 5 and 5.1.**	**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 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		**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 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **E 90**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		**E 90**	n x ≥ 1,0 mm^2 n ≥ 2 **E 90**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable ladder DUD400H60. Consoles WPCW/WPCO fixed to floor, brackets WWS/WWSO400, spacers BR40. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Tracks No. 6 and 6.1.**	**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 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		**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 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **E 90**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		**E 90**	n x ≥ 1,0 mm^2 n ≥ 2 **E 90**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable mesh tray KDS/KDSO400H60. Consoles WPCW/WPCO fixed to floor, brackets WWS/WWSO400, spacers BR40. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Tracks No. 7 and 7.1.**	**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 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		**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**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **E 90**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		**E 90**	n x ≥ 1,0 mm^2 n ≥ 2 **E 90**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	Cable ladder DUD400H60. Consoles combined of support CWP/CWOP40H40 and two threaded rods PGM8 are fixed to ceiling by anchors TRSOM8. 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**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **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
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	Cable tray KBJ400H60. Consoles WPCW/WPCO fixed to floor, brackets WWS/WWSO400, spacers BR40. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Tracks No. 8 and 8.1.**	**E 30**	n x ≥ 1,5 mm^2 n ≥ 2 **E 30**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		**E 60**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **E 90**
HTKSHekw FE180 PH90/E30-E90 240V	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 90**	n x 2 x ≥ 0,8 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**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		**E 90**	n x ≥ 1,0 mm^2 n ≥ 2 **E 90**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV + **cable connection TKM/E90**	Cable tray KGJ/KGOJ400H60. Consoles combined of support CWP/CWOP40H40 and two threaded rods PGM10 are fixed to ceiling by anchors TRSOM10. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Tracks No. 10 and 11.**	**E 60**	n x ≥ 1,5 mm^2 n ≥ 2 **E 60**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV + **cable connection TKM/E90**		**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 60**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV + **cable connection TKM/E90**		**E 60**	n x ≥ 1,5 mm^2 n ≥ 2 **E 60**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV + **cable connection TKM/E90**		**E 60**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V		**E 60**	n x 2 x ≥ 0,8 mm n ≥ 1 **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	Cable ladder DUD400H60. Consoles combined of support CWP/CWOP40H40 and two threaded rods PGM10 are fixed to ceiling by anchors TRSOM10. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Track No. 12.**	**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 30**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	Cable mesh tray KDS/KDSO400H60. Consoles combined of support CWP/CWOP40H40 and two threaded rods PGM10 are fixed to ceiling by anchors TRSOM10. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Track No. 13.**	**E 90**	n x ≥ 1,5 mm^2 n ≥ 2 **E 30**
	NHXCH FE180 PH90/E90 4x50/25 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**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		**E 90**	n x ≥ 1,5 mm^2 n ≥ 2 **E 30**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		**E 30**	

The element, Power and communication cables of Technokabel S.A. at cable supporting 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 for the following end use applications:

General:

- 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

Dávid Šubert
technician of the testing laboratory