FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION FIRES-JR-005-19-NURE

Cable supporting system NIEDAX with halogen-free power and communication cables Bitner

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FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION IN ACCORDANCE WITH STN 92 0205: 2014

FIRES-JR-005-19-NURE

Name of the product: Cable supporting system NIEDAX with halogen-free power and communication cables Bitner

Sponsor:
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1. INTRODUCTION

This expert judgement report with classification defines the functional resistance in fire classification assigned to element Cable supporting system NIEDAX with halogen-free power and communication cables Bitner in accordance with the classes given in STN 92 0205: 2014.

This expert judgement report defines field of application which is outside the field of direct application according test standard or outside the field of extended application according to relevant extended application standard. This expert judgement expresses the opinion of the FIRES and is based on the experience or internal rules of FIRES.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Cable supporting system NIEDAX with halogen-free power and communication cables Bitner, is defined as a cable supporting system for power and communication halogen free cables with circuit integrity maintenance.

2.2 PRODUCT DESCRIPTION

Product comprised of cable supporting system NIEDAX (cable trays, mesh trays, ladders with accessories) with halogen-free power and communication cables Bitner.

Cable supporting system of Niedax:

Cable tray RLVC 60
Cable tray is made of steel sheet thickness 0,75 mm, 0,8 mm or 0,9 mm thick. Height of side wall is 60 mm and maximum tested width is 400 mm. Trays are fixed together by integrated plug-in connectors and nut bolts (FLM 6x12) or alternatively by connectors RVV50 with nut bolts. Maximum tested loading is 20kg.m^{-1}. Tested cable trays are RLVC 60.300 and RLVC 60.400.

Cable tray RL 110
Cable tray is made of steel sheet thickness 0,8 mm, 0,9 mm or 1,0 mm thick. Height of side wall is 110 mm and maximum tested width is 400 mm. Trays are fixed together by connectors (RV 110.400) with nut bolts (FLM 6x12). Maximum tested loading is 20kg.m^{-1}. Tested cable tray is RL 110.400.

Cable mesh tray MTC 54
Cable mesh tray is made of longitudinal steel wires either ø 3,9 mm or ø 4,8 mm and transverse steel wires ø 3,9 mm, ø 4,8 mm or ø 5,8 mm. Height of side wall is 54,0 mm and maximum tested width of cable mesh tray is 400 mm. Mesh trays are fixed together by integrated plug-in connectors or alternatively by nut bolts GRHKM 6x15. Maximum tested loading is 15kg.m^{-1}. Tested mesh tray is MTC 54.400.

Cable ladder STL 60
Cable ladder is made of steel sheet thickness 1,5 mm and spacing of transoms is 300 mm. Cross-section dimensions of transoms are (30 x 15 x 1,5) 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 side connectors (KLVB 60/4) with nut bolts (FLM8x13, 4 pcs per connector). Maximum tested loading is 20kg.m^{-1}. Tested ladder is STL 60.403.

C-profile 2970
Profile with dimensions (30 x 15) mm is made of bent steel sheet 1,5 mm thick.
Profile is used for fixing of cables to ceiling and wall by cable clips.

C-profile 2987
Profile with dimensions (48 x 22) mm is made of bent steel sheet 1,75 mm thick.
Profile is used for suspension of trays and ladders.

C-profile 2986
Profile with dimensions (40 x 22) mm is made of bent steel sheet 2,0 mm thick.
Profile is used for suspension of trays and ladders.

Console HU 5050
Console consists of base plate with dimensions (140 x 80 x 5) mm and support with dimensions (50 x 50 x 2,5) mm. Console is used for gripping of brackets to ceiling.

Bracket KTA and KTAG
Bracket consists of two parts – base plate (from 4,0 to 6,0 mm thick) and bent steel sheet (from 1,5 to 2,0 mm thick) welded together. Brackets are used for fixation of trays and ladders.

Support TAH
Support consists of two parts and is made of bent steel sheet 4,0 mm thick and 30 mm wide.
Support is used for suspension of trays and ladders.

Trapezoidal hanger DBT 40
Hanger is made of bent steel sheet 1,5 mm thick.

Spacer HDS
Spacer is made of bent steel sheet 1,5 mm thick with dimensions (80 x 43) mm. Spacers are used for reinforcement of consoles at place of brackets fixation.

Suspension hanger DBG
Hanger consists of two part made of bent steel sheet with dimensions (58 x 54 x 4) mm. Hanger is used for fixation of threaded rod to ceiling or wall.

Cable clip SAS
Cable clip consists of two parts made of bent steel sheet from 1,2 to 2,0 mm thick and is used for fixation of cables to ceiling or wall.

Cable clamps "B"
Cable clamp consists of two parts made of bent steel sheet from 1,5 to 2,0 mm thick and is used for fixation of cables to ceiling or wall.

All parts of cable supporting systems are made of galvanized steel according to EN ISO 1461.

Steel chains were used for additional loading of tracks.

Cables
Halogen-free cables are used for applications in public buildings, where fire would present a significant hazard to human life as a result of emission of toxic gasses and dense smoke hampering the evacuation or when the losses caused by the corrosive acid gasses would be higher than other damage caused by fire.

Cables used by test:

Power cables:
BiTflame®1000 FE180/PH90/E90 0,6/1kV
BiTflame®1000C FE180/PH90/E90 0,6/1kV
NHXH FE180/E90 0,6/1kV
NHXCH FE180/E90 0,6/1kV
(N)HXH FE180/E90 0,6/1kV
(N)HXCH FE180/E90 0,6/1kV

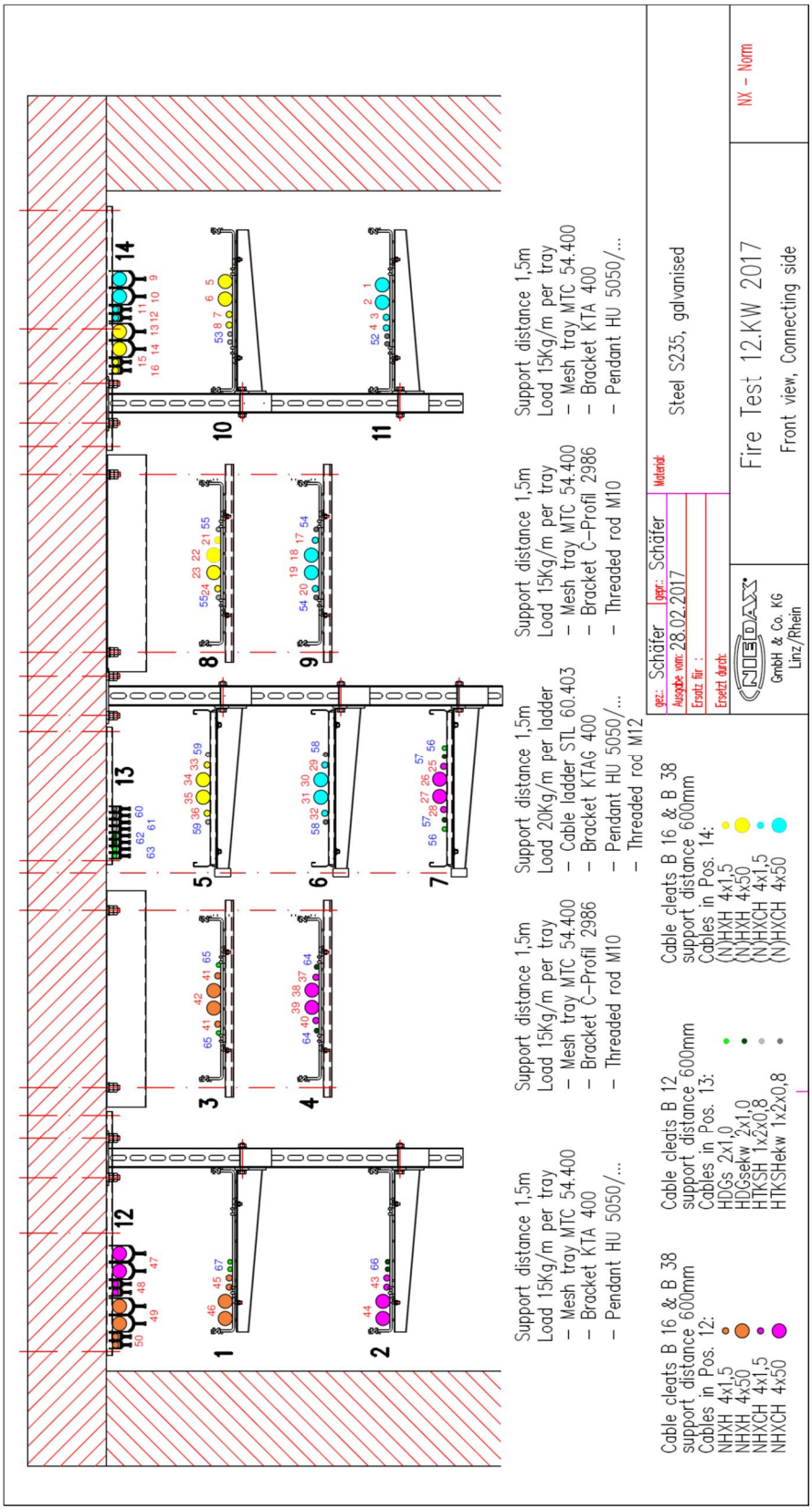
Communication cables:
HTKSH FE180/PH90/E90 225V
HTKSHekw FE180/PH90/E90 225V
HDGs FE180/PH90/E90 300/500V
HDGsekwf FE180/PH90/E90 300/500V

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

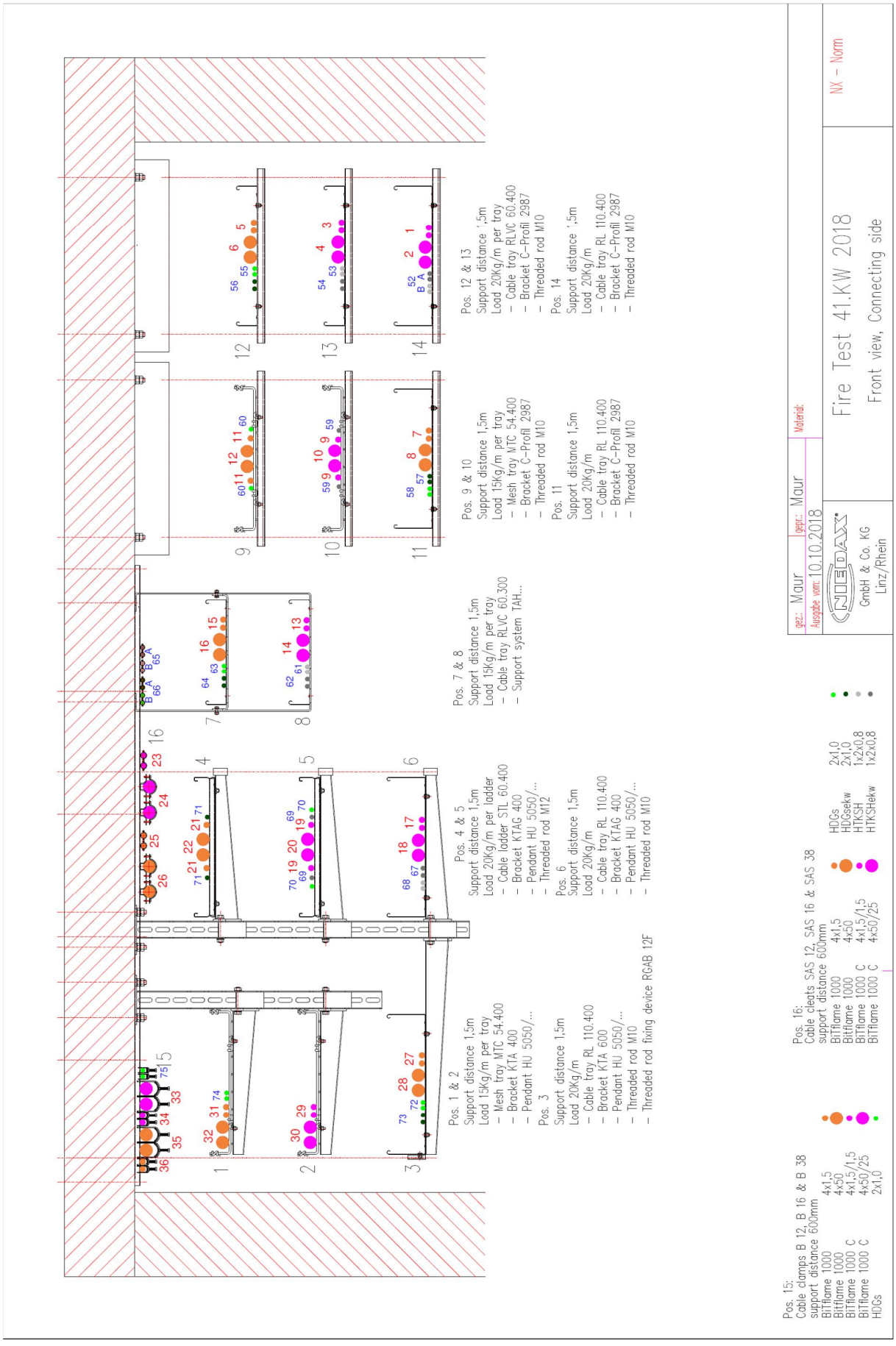
Cable penetration through the wall of test furnace was sealed by mineral wool and sprayed insulation material Tecwool.

More detailed information about product construction is shown in test reports [1] and [2].

Constructions tested by test [1]:



Constructions tested by test [2]:



3. TEST REPORTS AND EXTENDED APPLICATION REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS AND EXTENDED APPLICATION REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	Niedax GmbH & Co. KG, Linz am Rhein, DE	FIRES-FR-026-17-AUNE	23. 03. 2017	STN 92 0205
[2]			FIRES-FR-222-18-AUNE	11. 10. 2018	

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	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV	11	82 minutes
	2	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		74 minutes
	3	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		53 minutes
	4	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		51 minutes
	5	cable (N)HXH FE180/E90 4x50RM 0,6/1kV	10	90 minutes no failure / interruption
	6	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	7	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		67 minutes
	8	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		65 minutes
	9	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV	14	88 minutes
	10	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		85 minutes
	11	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	12	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		74 minutes
	13	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	14	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		41 minutes
	15	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		74 minutes
	16	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		79 minutes
	17	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	9	69 minutes
	18	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		73 minutes
	19	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		79 minutes
	20	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		69 minutes
	21	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV	8	78 minutes
	22	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	23	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	24	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	25	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	7	90 minutes no failure / interruption
	26	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	27	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	28	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	29	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	6	90 minutes no failure / interruption
	30	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	31	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	32	cable (N)HXCH FE180/E90 4x1,5RE/1,5 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	33	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV	5	90 minutes no failure / interruption
	34	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	35	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	36	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		33 minutes
	37	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	4	90 minutes no failure / interruption
	38	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		85 minutes
	39	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		88 minutes
	40	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	41	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV	3	90 minutes no failure / interruption
	42	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	43	2 cables NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	2	90 minutes no failure / interruption
	44	2 cables NHXCH FE180/E90 4x50RM/25 0,6/1kV		84 minutes
	45	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV	1	37 minutes
	46	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	47	2 cables NHXCH FE180/E90 4x50RM/25 0,6/1kV	12	90 minutes no failure / interruption
	48	2 cables NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	49	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	50	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	52	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	11	90 minutes no failure / interruption
	53	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	10	90 minutes no failure / interruption
	54	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	9	51 minutes
	55	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	8	90 minutes no failure / interruption
	56	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	7	90 minutes no failure / interruption
	57	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V		29 minutes
	58	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	6	47 minutes
	59	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	5	90 minutes no failure / interruption
	60	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	13	90 minutes no failure / interruption
	61	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V		90 minutes no failure / interruption
	62	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V		90 minutes no failure / interruption
	63	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V		87 minutes
	64	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V	4	90 minutes no failure / interruption
	65	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	3	90 minutes no failure / interruption
	66	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V	2	90 minutes no failure / interruption
	67	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	1	90 minutes no failure / interruption
[2] STN 92 0205: 2014	1	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	14	90 minutes no failure / interruption
	2	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	3	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	13	90 minutes no failure / interruption
	4	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	5	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	12	90 minutes no failure / interruption
	6	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	7	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	11	58 minutes
	8	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	9	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	10	90 minutes no failure / interruption
	10	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption

No./ Test method	Specimen No.		Cables	Track No.	Time to first failure / interruption of conductor
[2] STN 92 0205: 2014	11		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	9	90 minutes no failure / interruption
	12		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	13		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	8	90 minutes no failure / interruption
	14		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	15		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	7	90 minutes no failure / interruption
	16		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	17		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	6	77 minutes
	18		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	19		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	5	90 minutes no failure / interruption
	20		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		64 minutes
	21		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	4	90 minutes no failure / interruption
	22		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	23		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	16	90 minutes no failure / interruption
	24		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	25		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	26		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	27		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	3	53 minutes
	28		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	29		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	2	90 minutes no failure / interruption
	30		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	31		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	1	90 minutes no failure / interruption
	32		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	33		2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV	15	90 minutes no failure / interruption
	34		2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	35		2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	36		2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	52	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	14	90 minutes no failure / interruption
		B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	53		2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	13	90 minutes no failure / interruption
	54		2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	55		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	12	84 minutes
	56		2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	57		2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	11	90 minutes no failure / interruption
	58		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	59		2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	10	90 minutes no failure / interruption
	60		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	9	90 minutes no failure / interruption
	61		2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	8	90 minutes no failure / interruption
	62		2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	63		2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	7	41 minutes
	64		2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	65	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	16	90 minutes no failure / interruption
		B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	66	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
		B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
	67		2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	6	55 minutes
	68		2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		46 minutes

No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[2] STN 92 0205: 2014	69	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	**5**	90 minutes no failure / interruption
	70	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		60 minutes
	71	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	**4**	90 minutes no failure / interruption
	72	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	**3**	33 minutes
	73	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		74 minutes
	74	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	**1**	50 minutes
	75	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	**15**	90 minutes no failure / interruption

[1], [2] The tests were discontinued in 94th minute upon request of the 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 CLASSIFICATION

The element, **Cable supporting system NIEDAX with halogen-free power and communication cables Bitner**, 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/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]	Cable mesh tray MTC 54.400. Consoles HU 5050, brackets KTA 400 and spacer HDS 5050. Consoles in spacing of 1500 mm. Maximum loading 15kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 1, 2 and 10, 11 [1]. No. 1 and 2 [2].**	**PS 30**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 30**
	NHXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 60**
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 60**	
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 60**
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 45**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 45**
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 60**	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 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/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]	Cable mesh tray MTC 54.400. Consoles combined of C-profile 2986 and threaded rods M10. Consoles suspended to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 15kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 3, 4 and 8, 9 [1]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2
	NHXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	**PS 90**
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 60**	**PS 60**
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	**PS 60**
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 60**	**PS 60**
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 45**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 45**
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]	Cable ladder STL 60.403. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M12 and suspension hanger DBG 12. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 5 – 7 [1]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 90**	**PS 90**
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		**PS 30**	n x ≥ 1,5 mm^2 n ≥ 2
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	**PS 30**
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 90**	**PS 90**
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 15**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 15**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 45**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 45**

1) Supporting construction is made of segments of steel sheets 1,2 mm thick bent to wave 550 mm long. Individual segments are fixed to ceiling by 4 pcs of anchors in spacing of 1500 mm.

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/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RL 110.400. Consoles HU 5050, brackets KTA 600, spacer HDS 5050, threaded fixing device RGAB (fixed to outside edge of cable tray) and threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard track: No. 3 [2]**	**PS 45**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 45**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 30**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 30**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 60**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 60**
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable ladder STL 60.403. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 4 – 5 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 60**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 60**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 60**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 60**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]	Cable tray RL 110.400. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard track: No. 6 [2]**	**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 60**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 45**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 45**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 45**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 45**
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RLVC 60.300. Consoles TAH-D 300/500. Consoles in spacing of 1500 mm. Maximum loading 15kg.m^{-1}. Suspended installation. **Non-standard track: No. 7 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 30**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 30**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 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
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]	Cable tray RLVC 60.300. Consoles TAH-D 300/500. Consoles in spacing of 1500 mm. Maximum loading 15kg.m^{-1}. Suspended installation. **Non-standard track: No. 8 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable mesh tray MTC 54.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles suspended to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 15kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 9 and 10 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RLVC 60.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles suspended to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 12 and 13 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 60**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 60**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**

1) Supporting construction is made of segments of steel sheets 1,2 mm thick bent to wave 550 mm long. Individual segments are fixed to ceiling by 4 pcs of anchors in spacing of 1500 mm.

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/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RL 110.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m^{-1}. Suspended installation. **Non-standard tracks: No. 11 and 13 [2]**	**PS 45**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 45**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
NHXH FE180/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]	Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable yoke clamps type “B”. **Non-standard tracks: No. 12 – 14 [1]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	NHXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 90**	
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 90**	
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 30**
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		**PS 30**	
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		**PS 60**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 60**
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		**PS 60**	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 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
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable yoke clamps type "B". **Non-standard track: No. 15 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable clips SAS. **Non-standard track: No. 16 [2]**	**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		**PS 90**	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		**PS 90**	n x ≥ 1,5 mm^2 n ≥ 2 **PS 90**
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		**PS 90**	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		**PS 90**	n x ≥ 1,0 mm^2 n ≥ 2 **PS 90**
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		**PS 90**	n x 2 x ≥ 0,8 mm n ≥ 1 **PS 90**

The element, **Cable supporting system NIEDAX with power and communication halogen-free cables PRAKAB** with circuit integrity maintenance classes are classified to classes according to achieved test results of tested cables at tracks. Other classification is not allowed.

4.2 FIELD OF APPLICATION

This classification is valid for the following end use applications:

General

– the circuit integrity shall not be affected negatively by adjacent building constructions. Although testing is only carried out on test specimens of cable systems arranged horizontally, test results also apply to sloped or vertical arrangement provided the next conditions given in this chapter are met. In such a case the cable system shall be effectively fixed in places where it turns from horizontal to vertical arrangement, i.e. the cable products shall be attached effectively in places of bending;

NOTE. – In case of horizontal cable systems with cable trays or cable ladders no attachment of cable products by clips to these support structures is needed in practice

– direct application of test results obtained from tests of test specimen of cable system support and fixing structures is not possible to another construction project or to any other product from another manufacturer.

NOTE. – In practice it means that complier of support and fixing structures for cable system, which is a fire construction according to enactment [6], shall not use different arrangement of components or components from different manufacturers (for example suspension device or a boom from another manufacturer than the cable tray is), although individual components were successfully tested following this standard.

- test results obtained for cable system with cable trays are directly applicable also for usage of cable trays coverings; the coverings shall be ensured against movement with a proper manner;
- the condition for test results to be directly applied in practice is that the support and fixing structure is attached to a building construction which is sufficient in term of its statics performance for required period of circuit integrity, i.e. the element meets the criterion R according to EN 13501-2+A1;

NOTE. – A derogation from this requirement results from building fire safety design according to valid enactments and it is given in STN 92 0203.

- if the support and fixing structure is fixed directly to a building construction made of a rigid material such as concrete, bricks, aerated concrete or steel load-bearing construction, such anchoring components shall be used, which, in term of their properties, are suitable with respect to used material, used installation method, required thermal attack curve, required period of circuit integrity and mechanical action caused by the support and fixing structure with cables;
- without tests under considered fire temperatures the support and fixing structure may be fixed to a building construction only by means of bolted joints, riveted joints and welded joints made of elements standardized in term of their material and dimensions;
- in case when it is not possible to fix the support and fixing structure directly to a building construction, an additional construction may be used. Design of such construction shall apply all principles for design of support and fixing structure withstanding the fire effects for specified period. It is possible to verify the additional construction properties by means of a calculation in accordance with Eurocodes or by a test; for attachment of the additional construction to an element of building construction all requirements given in clauses 7.1.5 and 7.1.6 of STN 92 0205 apply;
- in case of both standard and non-standard support structures in according to 7.2 and 7.4 of STN 92 0205 the installation may be realized by another way under conditions given in Annex C of STN 92 0205;

Cable systems with integrated circuit integrity maintenance

- when cable test specimens according to 6.4.4.1.2 or 6.4.4.1.4 or 6.4.4.1.5 of STN 92 0205 are used the test results are directly applicable to all constructions of tested type of cable product in a specific type of cable system. It is not permitted to transfer the test results between support and fixing structures, which in any parameter differ from standard support structures;
- test results of cable systems obtained from tests with standard support structures from specified manufacturer are directly applicable also to tested cable systems with standard support structures of the same type from another manufacturer;

NOTE. – Type of standard support structure is a cable tray, cable ladder or cable clip.

- test results of cable systems with cable trays or cable ladders are applicable to all cable trays and cable ladders with the same construction and with width less than tested. Direct application of test results is possible also to other methods of joining of cable trays and cable ladders than shown on Figure 3b) of STN 92 0205 provided they are assessed by an accredited testing laboratory;
- support structures made of mesh cable trays according to EN 61537 are not considered to be standard support structures. In case of test specimens of support structures made according to EN 61537 of steel with a finishing the test results are directly applicable also to support structures of the same type and made of stainless steel but not vice versa;
- if a non-standard support structure is tested than the test results may be directly applied also to a similar standard support structure within a range stated by accredited testing laboratory;
- test results of a test specimen of cable system with cable trays or cable ladders which are suspended on the floor using suspension devices are directly applicable to these cable systems fixed to a wall according to Figure 6 of STN 92 0205;

NOTE. – A threaded rod with cross-section in accordance with needed tensile strength for relevant fire resistance period may be used as suspension device.

– test results of a test specimen of cable system with cable trays or cable ladders are directly applicable to all cable system parts used for changing of direction or dimension or for termination of lengths provided that individual disposition has been assessed by an accredited testing laboratory;

NOTE. – Typical examples of cable system are: elbows, fittings of shape T, cross elements.

NOTE 2. – In case of cable trays RLVC 60 (RES 60 – 90° elbow; RTS 60 – tee; RTA 60 – extension tee; RBA 60 – 45° elbow; RKS 60 – cross and RGV 60 – connector/joint for vertical offset.

NOTE 3. – In case of cable mesh trays MTC 54 (MTCE 54 – 90° elbow).

– in case of test with specimen of cable system with cable trays or cable ladders with joining point positioned in the middle of distance between supporting constructions, allowance of ± 5%, test result is directly applicable to any position of joining point between supporting constructions. If the position of joining point is closer to one of supporting constructions the test result is directly applicable only in case the point of cable tray or cable ladder joining is positioned in this reduced distance from supporting construction;
– test results of a test specimen of cable system with cable trays or cable ladders may be directly applied also in case of finishing by means of a coloured paint or spray representing a non-substantial component according to EN 13501 + A1; this painting or spraying may be realised only by manufacturer of cable trays or ladders. If the thickness of finishing layer is greater than given in EN 13501-1 + A1 a test according this standard shall be carried out;
– test results obtained from test of specimen of cable system with cable clips under the floor are directly applicable also to a horizontal cable system with cable clips on the wall;
– test results obtained from test of specimen of cable system with cable clips are directly applicable also to attachment of a number of cable products into one cable clip but maximal of three. For arrangement of more than 3 cables into one clip it a test shall be carried out;
– test results from test of cable system with cable clips under the floor are directly applicable to vertical cable system with cable clips on a wall provided that the cable product in cable system is effectively fixed (i.e. the distance between effective fixings is≤ 3 500 mm and the distance between cable clips is ≤ 300 mm) according to Figure 5a of STN 92 0205).
– in case of effective method of fixing according to Figure 5a) of STN 92 0205 the metal cable clips used are tested in standard support structures which are protected (spacing between protected clips is≤ 3 500 mm) by fire cladding against direct effect of heat exposition. The cladding shall meet integrity criterion E and insulation criterion I according to EN 13501-2 + A1 at least for period equal to required period of cable system circuit integrity.

NOTE 1. – For fulfilment of the EI criterion of fire cladding the test results from tests according to EN 1366-5 are used.

NOTE 2. – As an alternative to procedure described in NOTE 1 a test of fixing with full size may be carried out using standard temperature-time curve or using constant temperature attack according to EN 13501-2 + A1.

– another method of efficient fixing of cable product in a vertical cable system with cable clips using so-called meander dilatation fixing is shown on Figure 5b) of STN 92 0205;
– cable product in a vertical cable system with cable clips may be effectively fixed also by means of sealing of openings in ceilings and floors according to Figure 5c) of STN 92 0205 provided that the penetration seal satisfies fire resistance classification according to EN 13501-2 + A1 with period at least equal to period of cable system circuit integrity. However penetration seal fire resistance requirements resulting from fire safety disposition of the building according to relevant enactments are not affected;
– suitability of any other effective fixing design shall be assessed by an accredited testing laboratory;
– for vertical cable system with cable clips it is allowed to arrange more than one cable product into one clip but maximum of 3. For arrangement of more than 3 cable products into one clip it is necessary to carry out test with a method of effective fixing of cable products according to 7.4.12 of STN 92 0205;
– test results obtained from test with specimen of cable system with cable clips are directly applicable also to usage of protective tube for mechanical protection of cable product in accordance with

conditions given in 7.6 of STN 1101-1: 2013. Different application of protective tube is considered as non-standard support structure; such structure shall be tested according to this standard and test result may be directly applied only to a horizontal arrangement;

- in case of testing of several test specimens of the same cable system type within one test, the full classification of specified cable product type is achievable if at least 84 % of total number of identical cable test specimens in the same cable system type passes the test successfully. Remaining 16 % of test cable specimens shall be functional at least for 80 % of circuit integrity period achieved by successfully tested specimens;
- to achieve full classification of cable product of specified type it is possible to combine test results from two tests only after an assessment by approved testing laboratory;
- if a test specimen of cable for distribution of electric power with maximal cross-section of conductor less than 50 mm^2 is used, than test results are directly applicable to all cross-sections of conductors within a range from minimal to maximal tested conductor cross-section;
- in case of cable products for distribution of electric power with five or four conductors test results from tests with cable test specimen are directly applicable also to cable products with a less number of conductors (excepting cable products with one conductor);
- if test specimens of cables for electric power distribution with cross-section and number of conductors other than specified, than test results are directly applicable only to tested type of cable product with tested cross-section of conductor and type of cable system;
- in case only cable products for electric power distribution with minimal or maximal cross- section of the conductors passed the test satisfactorily, the test results are directly applicable only to tested type and cross-section of conductors and type of cable system;
- test results from testing of a test specimen of cables for control and communication are directly applicable to all constructions of specified type with diameter and number of conductors equal to or greater than those in cable test specimen;
- when test specimens of control and communication cables with a higher number of conductors are tested the test results are directly applicable only to cable product types with a number of conductors equal to or greater than that tested. The test results are directly applicable only to cable products with the same or greater diameter of conductor as used in cable test specimen;
- test results from test with a test specimen of optic cable are directly applicable to all constructions of specified type that have the same or greater number of optic fibres than that used in the cable test specimen;
- classification of cable system circuit integrity without carrying the tests according to 4.4.2 of STN 92 0205 is possible in case of cable products meeting only requirements of specific fire resistance according to 2.10 of STN 92 0205 which are intended for standard support constructions tested following this standard. The period of circuit integrity of this cable system is max of 15 minutes;

4.3 FIELD OF EXTENDED APPLICATION

- test results obtained from testing of individual cable clips/clamps attached to profile ledges are applicable to an attachment of individual clips directly into an element of building construction;
- based on the test results of cable supporting systems with cable trays or ladders it is allowed to apply direct application acc. to clause 7 of STN 92 0205 also for using of cables, which are not used to permanent electric power distribution if these cables are laid:
  - at separate cable tray or ladder on same consoles;
  - in same cable tray or ladder with cables with circuit integrity in fire, whereupon the cables shall be physically separated on whole length by partition;

  This application is valid for standard and non-standard supporting constructions. Maximum allowed loading of constructions shall be observed. Cable tray or ladder with cables which are not used for permanent electric power distribution shall be placed underneath of cable trays/ladders with fire resistance cables if the tracks are installed on the same consoles.

4.4 LABELING OF CABLE TRACK

The contractor shall always label the cable track at the accessible place and by permanent way. Label contains following information:

- the name of individual or legal person whose workers have installed the system;
- indication of cable bearing system which is stated in classification report;
- class of function in fire, number of classification report;
- year of installation of cable bearing system.

If the track is long, it is appropriate to repeat the labelling approximately every 50 m.

5. LIMITATIONS

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

The classification is valid until 23. 01. 2024 provided that the product, field of application and standards and regulations are not changed.

Approved:

Ing. Štefan Rástocký
leader of the testing laboratory

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Signed:

Dávid Šubert
technician of the testing laboratory