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FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION FIRES-JR-147-22-NURE

Cable supporting system of Niedax with power and communication cables of Technokabel S.A.

FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION IN ACCORDANCE WITH DIN 4102-12: 1998-11

FIRES-JR-147-22-NURE

Name of the product: Cable supporting system of Niedax with power and communication cables of Technokabel S.A.

Sponsor:
Niedax GmbH & Co. KG
Asbacher Strasse 141
Linz am Rhein D-53545
Germany

Prepared by:
FIRES, s.r.o.
Approved Body No. SK01
Osloboditeľov 282
059 35 Batizovce
Slovak Republic

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FIRES, s.r.o., Osloboditeľov 282, 059 35 Batizovce, Slovak Republic
tel. 00421 52 285 1611, www.fires.sk
Notified Body No. 1396, Approved Body No. SK01, Member of EGOLF

1. INTRODUCTION

This expert judgement report with classification defines the functional resistance in fire classification assigned to element Cable supporting system of Niedax with power and communication cables of Technokabel S.A. in accordance with the classes given in DIN 4102-12: 1998-11.

Test of function in fire was carried out according to standard STN 92 0205. Similar standards for tests of function in fire is DIN 4102-12: 1998-11.

Deviations from standard at the test according to DIN 4102-12: 1998-11: This test was carried out according to standard STN 92 0205: 2012 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: 2012, plate thermometers according to EN 1363-1: 1999 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1:1999 are used. Measurement by plate thermometers acc. to EN 1363-1: 1999 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1393-1: 1999. Therefore, it is possible to use results of test according to STN 92 025: 2012 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.

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

This product has already been classified by FIRES, s.r.o. and number of previous fire resistance expert judgement report with classification is FIRES-JR-152-17-NURE (issued on 06. 12. 2017) with validity until 06. 12. 2022. Document FIRES-JR-147-22-NURE replaces expert judgement report with classification FIRES-JR-152-17-NURE.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Cable supporting system of Niedax with power and communication cables of Technokabel S.A., is defined as a cable supporting system with cables with circuit integrity maintenance classes.

2.2 PRODUCT DESCRIPTION

Product comprise of cable supporting system NIEDAX – cable trays, mesh trays, ladders with accessories (consoles, brackets, supports, hangers, etc.) and power and communication halogen free cables of company Technokabel S.A..

<u>Cable supporting system:</u>

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 same 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 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.

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.

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 acc. to EN ISO 1461 and pre-galvanised sheet steel acc. to EN 10346.

Steel chains were used for additional loading of tracks.

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 firefighting (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:

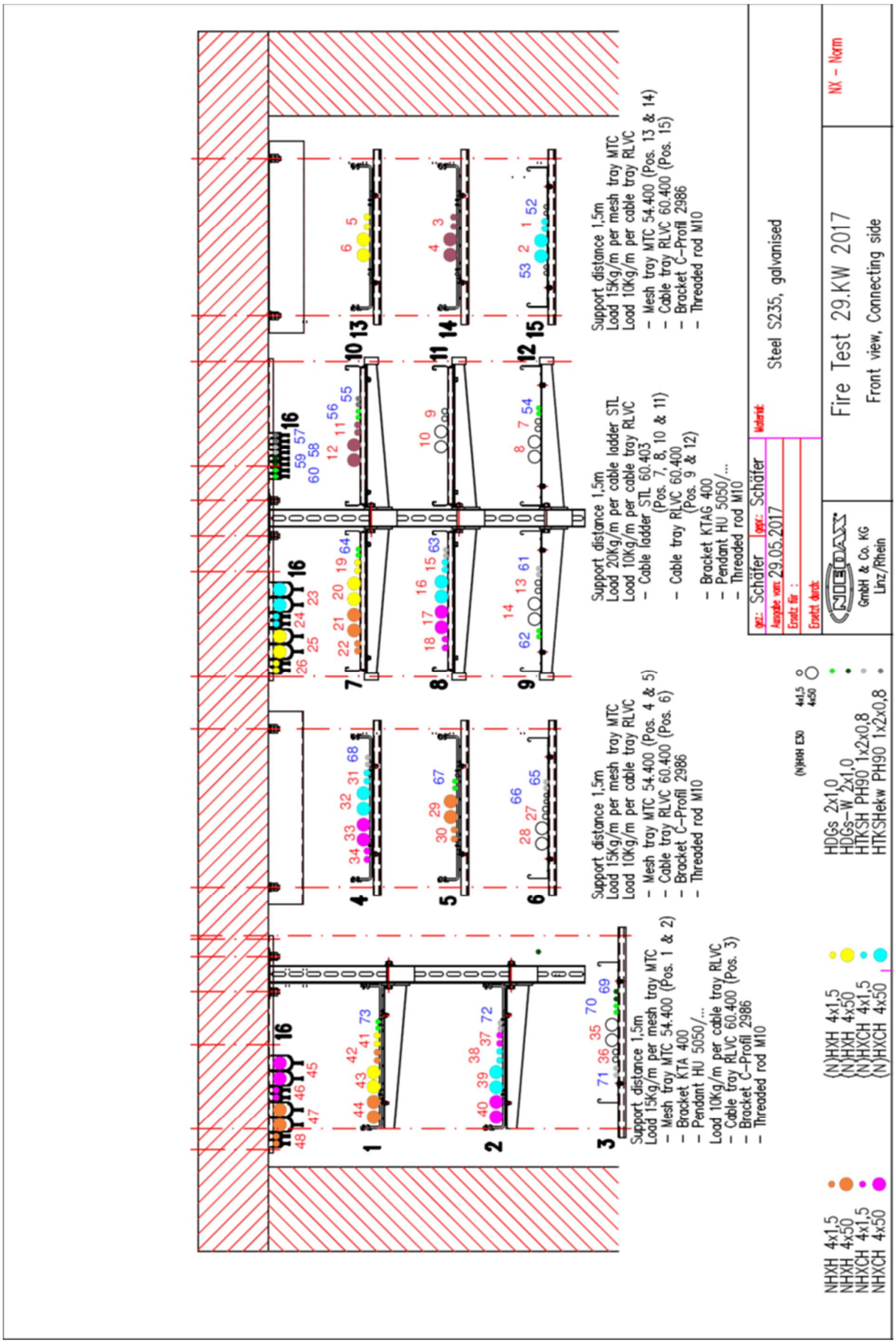
Power cables:
NHXH FE180 PH30/E30 0.6/1 kV
NHXH FE180 PH90/E90 0.6/1 kV
NHXCH FE180 PH90/E90 0.6/1 kV
(N)HXH FE180 PH30/E30 0.6/1 kV
(N)HXH FE180 PH90/E90 0.6/1 kV
(N)HXCH FE180 PH90/E90 0.6/1 kV
(N)HXCH-J-SERVO FE180 PH90/E90 0.6/1 kV

Communication cables:
HTKSH FE180 PH90/E30-E90 240 V
HTKSHekw FE180 PH90/E30-E90 240 V
HDGs FE180 PH90/E30-E90 300/500 V
HDGs-W FE180 PH90/E30-E90 300/500 V
HLGs FE180 PH90/E30-E90 300/500 V
JE-H(St)H Bd FE180/E30-E90 240 V

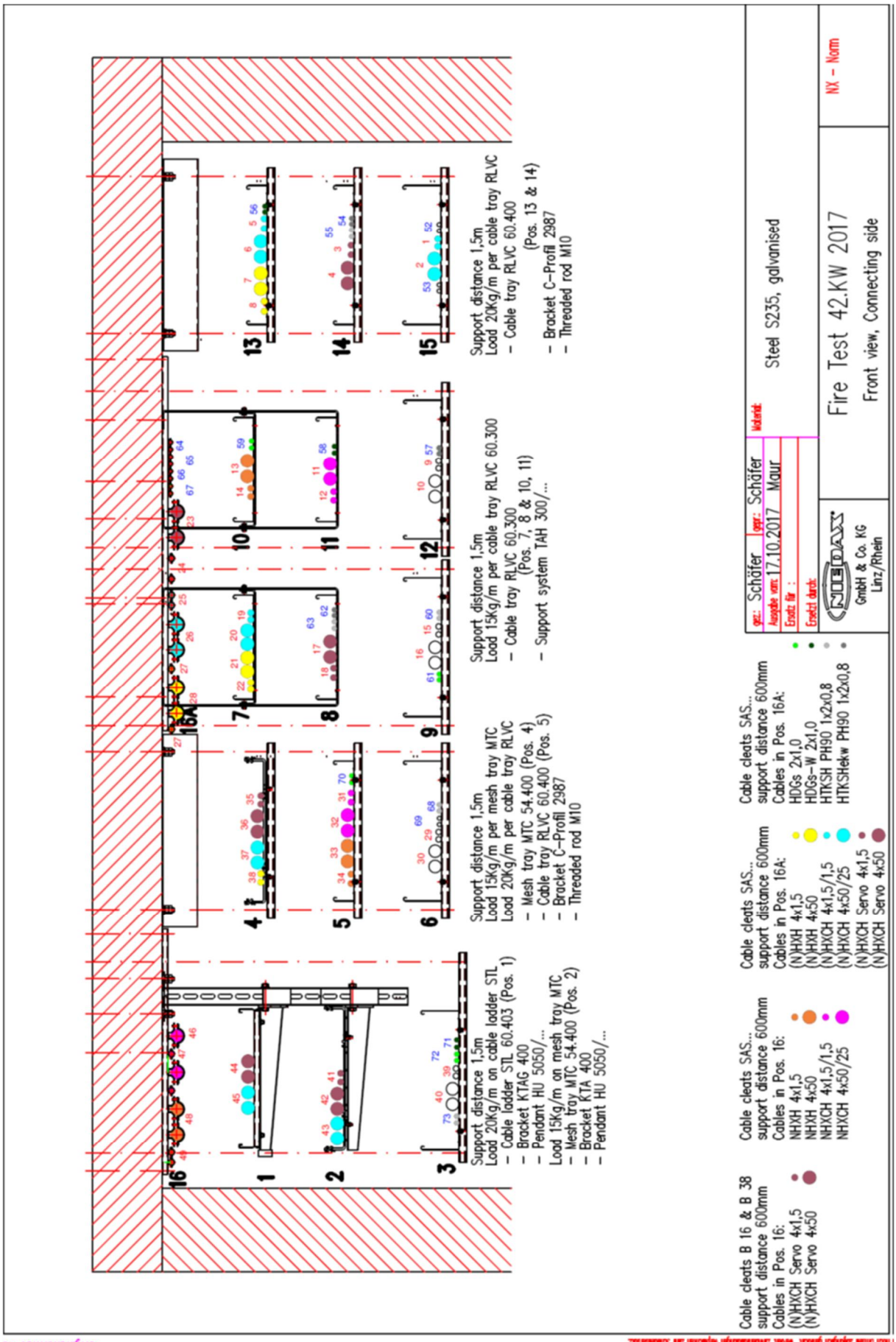
The length of cables was 5,2 m and 4,0 m from that was exposed to fire.

More detailed information about product construction is shown in the drawings which form an integral part of test report [1]. Drawings were delivered by sponsor.

Assembly of the tested structure, more information in the test report [1].



Assembly of the tested structure, more information in the test report [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-066-17-AUNE	19. 07. 2017	STN 92 0205
[2]			FIRES-FR-192-17-AUNE	19. 10. 2017	

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)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	15	76 minutes
	2	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	3	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	14	65 minutes
	4	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		37 minutes
	5	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	13	86 minutes
	6	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	7	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	12	32 minutes
	8	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		86 minutes
	9	2 cables (N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	11	90 minutes no failure / interruption
	10	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		68 minutes
	11	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	10	90 minutes no failure / interruption
	12	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		44 minutes
	13	2 cables (N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	9	90 minutes no failure / interruption
	14	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		43 minutes
	15	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	8	90 minutes no failure / interruption
	16	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		33 minutes
	17	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	18	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	19	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	7	90 minutes no failure / interruption
	20	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	21	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		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 (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV	16	90 minutes no failure / interruption
	24	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	25	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	26	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	27	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	6	31 minutes
	28	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	29	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	5	90 minutes no failure / interruption
	30	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	31	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	4	90 minutes no failure / interruption
	32	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		45 minutes
	33	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 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	34	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	35	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV	3	74 minutes
	36	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV		37 minutes
	37	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	2	90 minutes no failure / interruption
	38	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	39	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		84 minutes
	40	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	41	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV	1	90 minutes no failure / interruption
	42	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		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 NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	45	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	16	90 minutes no failure / interruption
	46	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	47	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	48	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	52	2 cables JE-H(St)H Bd FE180/E30-E90 1x2x0.8 mm 240 V	15	24 minutes
	53	2 cables HLGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		30 minutes
	54	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	12	90 minutes no failure / interruption
	55	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	10	90 minutes no failure / interruption
	56	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	57	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	16	90 minutes no failure / interruption
	58	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	59	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	60	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	61	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	9	61 minutes
	62	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		31 minutes
	63	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	8	90 minutes no failure / interruption
	64	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V	7	90 minutes no failure / interruption
	65	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	6	35 minutes
	66	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V		89 minutes
	67	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V	5	90 minutes no failure / interruption
	68	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	4	90 minutes no failure / interruption
	69	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	3	90 minutes no failure / interruption
	70	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	71	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		51 minutes
	72	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	2	90 minutes no failure / interruption
	73	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V	1	90 minutes no failure / interruption
[2] STN 92 0205: 2014	1	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	15	90 minutes no failure / interruption
	2	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	3	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	14	90 minutes no failure / interruption
	4	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	5	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	13	90 minutes no failure / interruption
	6	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	7	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	8	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	9	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	12	30 minutes
	10	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		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 NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV	11	90 minutes no failure / interruption
	12	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	13	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV	10	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)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	9	87 minutes
	16	2 cables (N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	17	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV	8	90 minutes no failure / interruption
	18	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		75 minutes
	19	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	7	90 minutes no failure / interruption
	20	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	21	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	22	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	23	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV	16A	90 minutes no failure / interruption
	24	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV		88 minutes
	25	2 cables (N)HXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	26	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	27	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	28	2 cables (N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	29	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	6	28 minutes
	30	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	31	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV	5	90 minutes no failure / interruption
	32	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	33	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		47 minutes
	34	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		48 minutes
	35	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	4	81 minutes
	36	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	37	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	38	2 cables (N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	39	2 cables NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV	3	28 minutes
	40	2 cables NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	41	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x1.5 RE 0.6/1 kV	2	9 minutes
	42	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	43	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	44	2 cables (N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV	1	90 minutes no failure / interruption
	45	2 cables (N)HXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV		90 minutes no failure / interruption
	46	2 cables NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV	16	85 minutes
	47	2 cables NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	48	2 cables NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV		90 minutes no failure / interruption
	49	2 cables NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV		90 minutes no failure / interruption
	52	2 cables JE-H(St)H Bd FE180/E30-E90 1x2x0.8 mm 240 V	15	62 minutes
	53	2 cables HLGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	54	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	14	90 minutes no failure / interruption
	55	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	56	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	13	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	57	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**12**	90 minutes no failure / interruption
	58	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**11**	90 minutes no failure / interruption
	59	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**10**	25 minutes
	60	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**9**	28 minutes
	61	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		59 minutes
	62	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**8**	46 minutes
	63	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		44 minutes
	64	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**16A**	90 minutes no failure / interruption
	65	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	66	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	67	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	68	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V	**6**	90 minutes no failure / interruption
	69	2 cables HTKSHekw FE180 PH90/E30-E90 1x2x0.8 mm 240 V		90 minutes no failure / interruption
	70	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**5**	33 minutes
	71	2 cables HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V	**3**	90 minutes no failure / interruption
	72	2 cables HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V		90 minutes no failure / interruption
	73	2 cables HTKSH FE180 PH90/E30-E90 1x2x0.8 mm 240 V		72 minutes

[1] The fire test was terminated in the 94th minute upon request of test sponsor.
Specimens S1 – S48 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S73 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.
Circuit breakers with rating 3 A were used.

[2] The fire test was terminated in the 94th minute upon request of test sponsor.
Specimens S1 – S49 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S73 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 ACCORDING TO DIN 4102-12: 1998-11

The element, **Cable supporting system of Niedax with power and communication cables of Technokabel S.A.**, 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 [1]	Cable mesh tray MTC 54.400. Consoles HU 5050, brackets KTA 400, spacers HDS 5050. Loading 15kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 1 and 2 [1] No. 2 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥ 2 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [1]		**E 90**	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**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 [2]		**Without classification**	**Without classification**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**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 2x1 mm^2 300/500 V [1]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [1]	Cable tray RLVC 60.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation to ceiling by suspension devices DBG12. Loading 10kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard system No. 3 [1]**	**E 30**	n x ≥1,5 mm^2 n ≥1 **E 30**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [1]		**E 60**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**E 30**	n x 2 x ≥0,8 mm n ≥1 **E 30**
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**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 [1]		**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
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [2]	Cable tray RL 110.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation directly to ceiling. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard system No. 3, 9 and 12 [2]**	**Without classification**	**Without classification**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [2]		**E 90**	
(N)HXH FE180 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [2]		**E 60**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**Without classification**	**Without classification**
HTKSHekw FE180 PH90/E30-E90 240V	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**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 2x1 mm^2 300/500 V [2]		**E 30**	n x ≥1,0 mm^2 n ≥2 **E 30**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**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 [1]	Cable mesh tray MTC 54.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M10. Loading 15kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 4 – 5 and 13 – 14 [1] No. 4 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [1]		**E 90**	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**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 [2]		**E 60**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**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 2x1 mm^2 300/500 V [1]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 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
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [1]	Cable tray RLVC 60.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M10. Loading 10kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 6 and 15 [1]**	**E 30**	n x ≥1,5 mm^2 n ≥1 **E 30**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [1]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 60**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**E 30**	n x 2 x ≥0,8 mm n ≥1 **E 30**
HTKSHekw FE180 PH90/E30-E90 240V	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**E 60**	n x 2 x ≥0,8 mm n ≥1 **E 60**
HLGs FE180 PH90/E30-E90 300/500V	HLGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**E 30**	n x ≥1,0 mm^2 n ≥2 **E 30**
JE-H(St)H Bd FE180/E30-E90 240V	JE-H(St)H Bd FE180/E30-E90 1x2x0,8 mm 240 V [1]		**Without classification**	**Without classification**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]	Cable tray RLVC 60.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M10. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 5, 13 and 14 [2]**	**E 30**	n x ≥1,5 mm^2 n ≥1 **E 30**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 30**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [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 [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**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 [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**E 30**	n x ≥1,0 mm^2 n ≥2 **E 30**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**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 [2]		**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 [2]	Cable tray RL 110.400. Consoles combined of C-profile 2986 and threaded rods M10. Fixation to supporting construction [1)] by trapezoidal hangers DBT40 and threaded rods M10. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 6 and 15 [2]**	**Without classification**	**Without classification**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [2]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**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 [2]		**E 90**	n x 2 x ≥0,8 mm n ≥1 **E 90**
HLGs FE180 PH90/E30-E90 300/500V	HLGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**
JE-H(St)H Bd FE180/E30-E90 240V	JE-H(St)H Bd FE180/E30-E90 1x2x0,8 mm 240 V [2]		**E 60**	n x 2 x ≥0,8 mm n ≥1 **E 60**
NHXH FE180 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]	Cable ladder STL 60.403. Consoles HU 5050, brackets KTAG 400, threaded rods M10, spacers HDS5050. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 7, 8, 10 and 11 [1] No. 1 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [1]		**E 90**	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
(N)HXH FE180 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [1]		**E 60**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 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
(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 [1]	Cable ladder STL 60.403. Consoles HU 5050, brackets KTAG 400, threaded rods M10, spacers HDS5050. Loading 20kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 7, 8, 10 and 11 [1] No. 1 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**E 90**	n x ≥1,0 mm^2 n ≥ 2 **E 90**
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**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 [1]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**
HTKSHekw FE180 PH90/E30-E90 240V	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**E 90**	n x 2 x ≥0,8 mm n ≥1 **E 90**
(N)HXH FE180 PH30/E30 0,6/1 kV	(N)HXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [1]	Cable tray RLVC 60.400. Consoles HU 5050, brackets KTAG 400, threaded rods M10, spacers HDS5050. Loading 10kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 9 and 12 [1]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 30**
	(N)HXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [1]		**E 30**	
NHXH FE180 PH30/E30 0,6/1 kV	NHXH-J FE180 PH30/E30 4x1.5 RE 0.6/1 kV [1]		**E 30**	n x ≥1,5 mm^2 n ≥1 **E 30**
	NHXH-J FE180 PH30/E30 4x50 RM 0.6/1 kV [1]		**E 60**	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**E 30**	n x ≥1,0 mm^2 n ≥2 **E 30**
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**E 60**	n x 2 x ≥0,8 mm n ≥1 **E 60**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**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 [2]	Cable tray RLVC 60.300. Supports TAH-D 300/500. Loading 15kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 7, 8, 10 and 11 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [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 [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [2]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 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
(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 [2]	Cable tray RLVC 60.300. Supports TAH-D 300/500. Loading 15kg.m^{-1}. Consoles in spacing of 1500 mm. **Non-standard systems No. 7, 8, 10 and 11 [2]**	**E 60**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**E 30**	n x 2 x ≥0,8 mm n ≥1 **E 30**
HTKSHekw FE180 PH90/E30-E90 240V	HTKSHekw FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**E 30**	n x 2 x ≥0,8 mm n ≥1 **E 30**
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**Without classification**	**Without classification**
HDGs-W FE180 PH90/E30-E90 300/500V	HDGs-W FE180 PH90/E30-E90 2x1 mm^2 300/500 V [2]		**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 [1]	Track 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 systems No. 16 [1]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 90**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [1]		**E 90**	
(N)HXH FE180 PH90/E90 0,6/1 kV	(N)HXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥2 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [1]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [1]		**E 90**	
HDGs FE180 PH90/E30-E90 300/500V	HDGs FE180 PH90/E30-E90 2x1 mm^2 300/500 V [1]		**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 [1]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [1]		**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 [1]		**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 PH90/E90 0,6/1 kV	NHXH-J FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]	Track made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable clips SAS. **Non-standard systems No. 16 [2]**	**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	NHXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [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 [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXH-J FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
NHXCH FE180 PH90/E90 0,6/1 kV	NHXCH FE180 PH90/E90 4x1.5/1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5/1,5 mm^2 n ≥1 **E 60**
	NHXCH FE180 PH90/E90 4x50/25 RM 0.6/1 kV [2]		**E 60**	
(N)HXCH FE180 PH90/E90 0,6/1 kV	(N)HXCH FE180 PH90/E90 4x1.5 RE 0.6/1 kV [2]		**E 90**	n x ≥1,5 mm^2 n ≥1 **E 90**
	(N)HXCH FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**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 [2]		**E 60**	n x ≥1,5 mm^2 n ≥1 **E 60**
	(N)HXCH-J-SERVO FE180 PH90/E90 4x50 RM 0.6/1 kV [2]		**E 90**	
HTKSH FE180 PH90/E30-E90 240V	HTKSH FE180 PH90/E30-E90 1x2x0,8 mm 240 V [2]		**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 [2]		**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 2x1 mm^2 300/500 V [2]		**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 [2]		**E 90**	n x ≥1,0 mm^2 n ≥2 **E 90**

The element, Cable supporting system of Niedax with power and communication cables of Technokabel S.A. 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:

- throughout the period during which circuit integrity is to be maintained, neighboring 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. in 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;
- test results of function in fire test of cables tested at standard supporting construction are also applicable for tested standard supporting construction of other producers;
- test results of function in fire test of cables tested at standard supporting construction are also applicable for cables of other producers tested at standard supporting construction;

- where risers are used, circuit integrity classification only applies if the cable is effectively supported (i.e. with a spacing of supports of 3 500 mm or less and the distance between cable clips is ≤ 300 mm). Figure 5 of standard DIN 4102-12 shows a suitable means of mounting cables on risers. 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 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**.** Brackets of proven suitability may also be used, as long as their spacing is equal to that of the single clips tested;
- test results of testing single cables on the ceiling apply also to cables mounted horizontally on walls;
- test results of testing bunched cables on a ladder or tray also apply to support construction attached to a wall. However, such constructions required proof of suitability by means of a test certificate or other document issued by an accredited testing laboratory;
- **classification for type of cable (by cross-sections and number of conductors) is valid only for tested cable types, number and cross-sections of conductors;**
- **classification for cable is valid for all numbers and cross-sections of tested cable type;**
- **test results of cable systems placed on a non-standard support structures are directly applied only to the tested cable systems;**
- **test results of cables tested at cable trays or ladders are applicable also for another products trays and ladders (cross, elbow, T-bend, bends and etc.;**
- **direct application of test results is possible also to other methods of joining of cable trays and cable ladders than shown of DIN 4102-12 provided they are assessed by an accredited testing laboratory;**
- **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 weight of the cover must be added to the total load;**
- **test result obtained from testing of cables with five or four conductors applies also to cables of the same type with smaller or greater number of conductors;**
- **test results obtained for products used for connection of cables may be directly applied also to an application with cable products from another manufacturer which were tested following this standard and those constructional realisation was assesses by an approved testing laboratory;**
- **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;**
- **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;**
- **results from tests carried out on cable trays and cable ladders are applicable to all cable trays and cable ladders of identical construction of smaller width than tested;**

4.3 LABELING OF CABLE TRACK

Contractor marks cable system by attachment of label which must contain the following informations:
- name of responsible person, who installed the system;
- name of cable system as it is stated in this judgement;
- class of circuit integrity maintenance and classification report number;
- real value of mechanical loading of cable system by cables
- date of assembly of cable 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 provided that the product, field of application and standards and regulations are not changed.

Approved by:

Ing. Štefan Rástocký
Chief Operating Officer

Prepared by:

Ing. Slavomír Hudák
Technician of the Testing Laboratory