

Series: NATIONAL TECHNICAL ASSESSMENTS

CNBOP-PIB NATIONAL TECHNICAL ASSESSMENT CNBOP-PIB-KOT-2023/0371-3703 issue 2

**This CNBOP-PIB National Technical Assessment replaces
CNBOP-PIB National Technical Assessment No CNBOP-PIB-KOT-2023/0371-3703 issue 1**

Pursuant to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Dz. U. 2016, item 1968) as a result of the proceedings to issue a National Technical Assessment carried out in the Scientific and Research Centre for Fire Protection - National Research Institute (CNBOP-PIB) in Józefów near Otwock at the request of the company:

BAKS Wytwarzanie Osprzętu Instalacyjno – Elektrotechnicznego
Kazimierz Sielski
ul. Jagodne 5
05- 480 Karczew

we hereby issue a positive assessment of the performance for the intended use of the construction product under the name:

**BAKS cable systems
(cable support structures with electric conductors and cables) in
the circuit integrity maintenance class E30, E60, E90 according to
DIN 4102-12**

Manufacturer of support structures: BAKS

**Manufacturers of conductors and cables: BITNER, DÄTWYLER, ELKOND, EUPEN,
NEXANS, FACAB LYNEN, PRAKAB, LEONI
STUDER, TECHNOKABEL, TELE-FONIKA KABLE,
MADEX, KABLOTEK, ELPAR, NKT, ERSE, VLG**

with the purpose, scope, conditions and terms specified in the Annex, which is an integral part of this CNBOP-PIB National Technical Assessment.

Validity date

from 22 February 2023
to 02 January 2028

Deputy Director
for certification and approvals

Sr. brig. dr inż. Jacek Zboina

Annex

General and technical provisions

Józefów, 22 February 2023

CNBOP-PIB National Technical Assessment No CNBOP-PIB-KOT-2023/0371-3703 t, Issue 2 contains 110 pages. It is permissible to copy the CNBOP-PIB National Technical Assessment in its entirety or only the first page. Copying, publishing or disseminating in any other form of the fragments of the National Technical Assessment requires a written agreement with the Scientific and Research Centre for Fire Protection - National Research Institute.

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GENERAL AND TECHNICAL PROVISIONS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

1.1. General technical characteristics of the product

The subject of this CNBOP-PIB National Technical Assessment are BAKS cable systems (cable support structures with electric conductors and cables) with the circuit integrity maintenance class E30, E60, E90 according to DIN 4102- 12:1998 – sets of products consisting of BAKS cable support structures and cables produced by the manufacturers indicated in Table 2.

BAKS cable systems ensure the **continuity of power supply or signal transmission under fire conditions** for the time required for the start-up and operation of fire protection equipment¹ and are classified as **electrical functions support class E30, E60 or E90**, according to DIN 4102-12:1998, depending on the type and type of cable supporting structure and the type and type of cable used.

The maintenance of the integrity of the cable system is understood as its ability to maintain continuous transmission of electrical energy and IT signals (e.g. in emergency power supply circuits) at the fire temperature determined by the standard curve (ETK) for 30, 60 or 90 minutes and under static rated load.

BAKS cable systems include:

- standard systems which are constructed according to section 7.3.3.3 of DIN 4102- 12:1998,
- Special (above-standard) systems which have parameters other than those specified in section 7.3.3.3 of DIN 4102-12:1998 with regard to the fixing method, material thickness, type of substrate, type of material and type of coating, e.g. mesh trays, structures with a larger spacing of suspension points, etc.

The assessment of BAKS cable systems in the scope of maintaining circuit integrity (continuity of electrical power supply or signal transmission), taking into account the type of substrate and expected fixing method, is performed in accordance with the conditions specified in the Polish Standard for Fire Resistance Testing PN-EN 1363-1:2012 and PN-EN 1363-1:2020-07 Fire resistance tests - Part 1 General requirements and DIN 4102-12:1998 Fire performance of construction materials and components - Part 12: Maintenance of the circuit integrity of cable systems - Requirements and tests. The test procedure for standard and special cable systems is compliant with the DIN 4102-12:1998 standard.

The scope of application of BAKS cable systems is limited to cables with a rated voltage of 1 kV.

BAKS cable systems may, **with reservation to section 2.2 of this CNBOP-PIB National Technical Assessment**, include BAKS cable support structure elements listed in Table 1 and designated cable types produced by the manufacturers listed in Table 2.

¹ In accordance with the Regulation of the Minister of Infrastructure on technical conditions to be met by buildings and their location of 12 April 2002 (consolidated text Dz. U. No. 2022, item 1225),

Annex 1 contains the drawings of standard BAKS cable support structures and classifications of cable systems according to DIN 4102-12:1998, depending on the used configuration of the standard cable supporting structure and cable.

Annex 2 contains the drawings of special BAKS cable support structures and classifications of cable systems according to DIN 4102-12:1998, depending on the used configuration of the special cable supporting structure and cable.

In Annex 3, since the DIN 4102-12:1998 standard does not provide for:

- E120 classification, Tables 1-19 present the result of the test in the form of the achieved duration of continuity of electricity supply under fire conditions, depending on the special cable support structure and cable configuration used,
- E classification for fibre optic cables, Tables 20-21 present the time taken to maintain adequate functionality, i.e. a maximum change in attenuation of $\leq 1\text{dB/m}$ for single-mode fibre optics and $\leq 2\text{dB/m}$ for multimode fibre optics (in accordance with PN-EN 50582:2016-12), depending on the special cable support structure and cable configuration used,

Annex 4 contains connection drawings for BAKS trays, cable racks, channel sections and mesh trays and their fixing method to support structures.

Table 1

TRAY SYSTEM		
No.	Product name	Symbol
1	Cable tray	KGL/KCL 50H60 KCL100H42 KCL100 - 300H60, KCL/KCOL100 - 300H60 KCJ100 - 400H60, KCJ/KCOJ100 - 400H60 KLFL75H60 KGL100H42 KGL100 - 300H60, KGL/KGOL100 - 300H60 KGJ100 - 400H60, KGJ/KGOJ100 - 400H60 KFL50H60 KFL100 - 300H60 KFJ100 - 400H60 KBL50 - 300H60 KBJ100 - 400H60 KCD100 - 400H60, KCD/KCOD100 - 400H60 KCP100 - 600H60, KCP/KCOP100 - 600H60
2	Tray connector	LPPH42 LPPH60, LPP/LPOPH60N LPLPH60 LKJH42 LKJH60, LKJ/LKOJH60 LKFJH60 LUF... LUPFJ... LPU... LPMU...
3	Articulated tray connector	LGJH42, LGJH60, LGPH60, LGP/LGOPH60N, LGFJH60
4	Connection plate	BL100 - 600, BL/BLO100 - 600N
5	End plate	BZK100 - 600, BZK/BZKO100 - 600N
	System fittings for trays, such as: elbows, reduction elbows, tees, reduction tees, four-way pieces, reductions, bend elements, bends, bypasses, split connectors, plugs, etc.	KK... KM... KR... TK... TR... TP... CZK... CZP... RK... EL..., LL..., LU... OP... LR... ZKL... etc.
7	Covers for trays and fittings	PK..., PZK... PKK..., PZKK... PKP... PTK..., PZTK... PCZP... PCZK..., PZCZK... PRK..., PTR..., PKR... etc.
8	Cover fastening	ZPN..., ZPD..., ZAP...
9	Cover latches	ZAMK...
10	Partitions for trays and fittings (partitions fixing with mushroom head screws + serrated face nut SGK6x... max every 600 mm)	PG... PL... PGK...
11	Partition connector	LPG, LPKD
MESH TRAY SYSTEM		
12	Mesh tray	KDS60 - 600H60, KDS/KDSO60 - 600H60 KDSZ60 - 400H60 KGS60 - 100H60 KSG60 - 600H60
13	Mesh tray connector	USSP USSN, USSN/USSO USSPW, USSPW/USSPWO USKS LKSUC..., PKKS, PSKS, PDKS L1KD..., L2KD
14	Mesh tray fittings: - made by cutting rods and bolting with brackets	- number of cut-outs: 2-12, USSN, USSN/USSO, USSPW, USSPW/USSPWO, ZS, ZS/ZSO, USSW, PLC..., PLS, PKKS, PSKS, PDKS

	- by using system fittings: elbows, tees, plugs and clamping brackets	- KKS... TKS... ZKL... PDKS etc.
	Drop-out plate	ZKSN...
	Grounding clamp	UUS
15	Partitions for mesh trays (partitions fixing with ZS/ZSO clamping pieces max every 600 mm)	PG...
16	Partition connector	LPG, LPD
RACK SYSTEM		
17	Cable rack	DGOD100 - 400H60, DGOP100 - 600H60, DUJ100 - 400H60, DUD100 - 400H45, DUD100 - 600H60, DUP100 - 600H60, DUP/DUOP100 - 600H60N DFP100 - 400H60 DSH100-400H80 DUVC100 - 600H60
18	Rack connector	LDCH... LDC/LDOCH60N LDFCH60 LKDCH..., LKDC/LKDOCH60 LKDFCH60, LLUS... LKU..., LDDK... LPLS...
19	Articulated rack connector	LGCH..., LGTH..., LGC/LGOCH60N, LDD...
20	Rack fittings, such as: bend, vertical bend, articulated bend, tee, four-way piece, reduction, drop-out plate, etc.	LD... LPD... TD... CZ... RD... ZDK... etc.
21	Covers for racks and fittings	PDD..., PZDD... PLD..., PZLD... PTD..., PZTD... PCZD..., PZCZD... PRD..., PZRD... PLPD..., PZLPD... etc.
22	Cover fastening	ZAP...
23	Partitions for racks (partitions fixing with SRM6x16 or SGK6x22 screws every 600 mm)	PG...
24	Partition connector	LPG, LPD
WALL TRUNKING SYSTEM		
25	Wall trunking	KS115-170H68
26	Wall trunking connector	LKS
27	Wall trunking fittings: elbows, tees, caps, plugs	KWKS... KZKS... KPKS... TSKS... NM... ZK... etc.
28	Wall trunking cover	PKS
29	Cover spring bracket	SU

ACCESSORIES		
30	Extension bracket	WMC 100 - 600, WMC/WMCO 100 – 600 WWS 100 - 600, WWS/WWSO 100 – 600 WWSR100 - 400, WWCT 100 - 600, WWCT/WWCTO 100 – 600 WU 100 - 400, WU/WUO 100 - 400 WPT100, WPT/WPTO 100 WPTKO 100 - 400 WWCH 100 - 600
31	Hanger	WC50, WKS60, WKS/WKSO60, WSL75,
32	Bracket	WFL100 - 600, WFL/WFLO100 - 600 WFC100 - 400, WFC/WFCO100 - 400
33	Triangular bracket	UTM, UTM/UTMO, UT, LCKD
34	Mesh tray bracket	USK, USKH100, UKSPH100
35	Ceiling bracket	WPCW..., WPCW/WPCO... WPCE..., WPCE/WPCEO... WPCB... WPDH...
36	Fastening clamp	ZM, ZM/ZMO
37	Screw clamp	ZS, ZS/ZSO
38	Clamp	ZSW
39	Reinforced channel	CWP40H22/... CWP40H40/..., CWP/CWOP40H40/..., CMP41H21/..., CMP41H41/... CT70H50/...
40	Channel connector	LC...
41	Mounting profile	PMC..., PMC/PMCO... PMCN...
42	I-beam	DPH...
43	I-beam fastening clamp	NKH
44	I-beam bracket adapter	OD
45	Bracket	UPW, UPW/UPWO UPWK, UPWK/UPWKO
46	Cable clamp	UK1..., UK1/UKO1... UK2..., UK2/UKO2... UKZ1..., UKZ1/UKZO1...
47	Cable tie	OPK
48	Rung	SDP..., SDP/SDOP..., SDC..., SDC/SDOC... CMSC41H21/...
49	Ceiling bracket	USV, USV/USOV US12, US12/USO12
50	Articulated rod hanger	WPPG, WPPGV, WPPGV/WPPOV
51	Angle rod hanger	WKPO
52	Cable clip	UDF..., UDFB... UEF..., UEFB...
53	Cable clamp	KSA...
54	Snap clamp	OZ, OZ/OZO OZS, OZS/OZSO OZM, OZM/OZMO
55	Thin-walled tubes	RU...
56	Couplings for thin-walled tubes	LRU...
57	Elbows for thin-walled tubes	KRUR...
58	End caps for thin-walled tubes	ZR...
59	Pipe covers...	NKR...
60	Clamp	ZK..., ZC..., ZSU3, ZSK1
61	Hold down clamp	UDC
62	Trapeze hanger	WT..., WT/WTO...
63	Pipe clamp	OBR..., OBS..., OBRK...
64	Head plate	PSUN, PSUN/PSUNO, PSEN, PSCN
65	Protection tray	RO1...
66	Pressure pin	KM6X15
67	Spacer washer	PD11
68	Expansion plate	BR...
69	Box brackets	UP... UPU UPP... UPPO...
	Protective caps	NO...

SCREWED ELEMENTS		
71	Bolts/anchors/pins/screws*	SRO... (HK M6/4; KDM) SRBO... (HK M6/0) PSRO... (FBN II; R-HPTIIZF; MTP AP) PSRZ... (FAZ II) GSO... (FDN; DBZ 6/4,5; T-DN) KWBO... (FNA II) SBO... (FBS; HUS-P) SBSO... (FBS) KKG... (HM) MKR... (FMD) SKT... (SFI; SDU) KRN... (FF1) KSKO... (FHY) KSSKO... (R-RBL) WDB...
72	Expansion sleeves*	TRSO... (HKD; EA II; EM; DM-PRO) TRSK... (HKD; EA II)
73	Self-drilling screws*	SMD... (S-MD03PZ, ONS)
74	Anchor bolt*	SKT...
75	Cartridge nails*	GWT... (R-KNC), GWTS...
76	Chemical anchors*: Threaded rod, glass ampoule, injection mortar, mesh sleeves	PGS... (FTR) AS (FEB RM) ZIO... (FIS..., R-KEM II) TST..., TSM...
77	Bolts	SGN... SGF... SGK... SGKF... SM... SRM... SSZ...
78	Nuts	NS... NR...
79	Washers	PP... PW... PZZ...
80	Connection nuts	NL...
81	Threaded rods	PG...
82	Smooth rods	PGLO...

* – trade name used by BAKS

Table 2

No.	Manufacturer	Cable types
1.	Zakłady Kablowe BITNER Sp z o.o. ul. Friedleina 3/3 30-009 Kraków Poland	NXHX FE180/PH90/E90 MIKA NHXCH FE180/PH90/E90 MIKA (N)HXH FE180/PH90/E90 CERAMIC (N)HXCH FE180/PH90/E90 CERAMIC HDGs FE180/PH120/E90 HDGsekwf FE180/PH120/E90 HTKSH FE180/PH90/E90 HTKSHekw FE180/PH90/E90 Bitflame® S FE180/PH120/E90 Bitflame® S(St) FE180/PH120/E90 Bitflame® AS FE180/PH90/E90 Bitflame® AS(St) FE180/PH120/E90 Bitflame® 1000 FE180/PH120/E90 Bitflame® 1000C FE180/PH120/E90 Bit servo® FS FE180/PH90/E90 PGI-H FE180/PH90/E90 Fiber optic cables: Bitfiber® Flame CLT SMF Bitfiber® Flame CLT MMF

2.	DÄTWYLER Kabel+Systeme GmbH Lilienthalstrasse 17 DE-85399 Hallbergmoos Germany	NHXH FE180/E90 (N)HXH FE180/E90 (N)HXH FE180/E30 (N)HXCH FE180/E90 (N)HXCH FE180/E30-E60 JE-H(St)H FE 180/E30-E90 JE-H(St)HRH FE 180 E30-E90
3.	ELKOND HHK a.s. Oravicka 1228 028 01 Trstena Slovakia	N2XH FE180/P30 N2XH FE180/P60 NHXH FE180/P90, JE-H(St)H FE180/P30 JE-H(St)H FE180/P90 1-CXKH-V SHXKFH-V180
4.	Kabelwerk EUPEN AG Malmedyer Str. B-4700 Eupen Belgium	NHXH-J FE 180/E90 NHXCH-J FE 180/E90 NHXCH FE 180/E90 (N)HXH FE 180/E90 (N)HXCH FE 180/E90 JE-H(St)H FE 180/E90
5.	Nexans Deutschland Industries GmbH Kabelkamp 20 30179 Hannover Germany	N2XH E90 N2XH E30 N2XCH E90 N2XCH E90
6.	FACAB Lynen Dürener Str. 340 D-52249 Eschweiler Germany	NHXH FE 180/E90 NHXCH FE 180/E90 JE-H(St)H FE 180/E90 JE-H(St)HRH FE 180/E90
7.	PRAKAB PRAŽSKÁ KABELOVNA a.s. Ke Bablu 278 102 09 Praha 15 Czech Republic	(N)HXH PRA FlaDur 1-CSKH-V180-0 P30-R PH120-R B2ca s1d0 PRA FlaDur 1-CSKH-V180-0 P30-R
8.	LEONI Studer AG Herrenmattstrasse 20 CH-4658 Däniken Switzerland	BETAFLAM (N)HXCH FE 180/E90 BETAFLAM (N)HXCH FE 180/E30 - E60 BETAFLAM (N)HXH-J FE 180/E30-E60 JE-H(St)H...Bd FE 180/E30 - E90 JE-H(St)HRH...Bd FE 180/E30 - E90
9.	TECHNOKABEL S.A. Nasielska 55 04-343 Warsaw Poland	NHXH FE180 PH90/E90 0.6/1 kV NHXH-J FE180 PH90/E90 0.6/1 kV NHXHX FE180 PH90/E90 0.6/1 kV NHXHX-J FE180 PH90/E90 0.6/1 kV NHXCH FE180 PH90/E90 0.6/1 kV (N)HXH FE180 PH90/E90 0.6/1 kV (N)HXH-J 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 NHXHRHX FE180 PH90/E90 0.6/1 kV NHXHRHX-J FE180 PH90/E90 0.6/1 kV JE-H(St)H FE 180 PH90/E30-E90, HTKSH FE180 PH90/E30-E90 HTKSHekw FE180 PH90/E30-E90 HDGs FE180 PH90/E30-E90 300/500V HDGszo FE180 PH90/E30-E90 300/500V HDGsekw FE180 PH90/E30-E90 300/500V HDGsekwzo FE180 PH90/E30-E90 300/500V HDGs-W FE180 PH90/E30-E90 300/500V HDGszo-W FE180 PH90/E30-E90 300/500V, HLGs FE180 PH90/E30-E90 300/500V HLGszo FE180 PH90/E30-E90 300/500V HLGsekw FE180 PH90/E30-E90 300/500V HLGsekwzo FE180 PH90/E30-E90 300/500V Fiber optic cables: FOC-2-SLT-HFFR PH120/E30 9/125 SM FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2
10.	TELE-FONIKA KABLE Sp. z o. o. S.K.A. ul. Wielicka 114 30- 663 Kraków Poland	FLAME-X 950 NHXH FE180 PH90/E90 FLAME-X 950 (N)HXH FE180 PH90/E90 FLAME-X 950 NHXCH FE180 PH90/E90 FLAME-X 950 (N)HXCH FE180 PH90/E90 FLAME-X 950 HTKSH FE180/PH90/E90 FLAME-X 950 HTKSHekw FE180/PH90/E90

		FLAME-X 950 HDGs 300/500V (FE180) PH90 E30-E90 FLAME-X 950 JE-H(St)H Bd FE180/E90 FLAME-X 950 HLGsekw E90
11.	Fabryka Kabli MADEX s.j. Stefanówka ul. Żurawia 96 05-462 Wiązowna Poland	NHXX FE180 PH90/E90 NHXXCH FE180 PH90/E90 HTKSH PH90 HTKSHekw PH90
12.	KABLOTEK KABLO Alipasa mevkii Sanayi 12 Sokak No:7 Silivri-Istanbul Turkey	NHXX-O FE180/E90 NHXXCH-O FE180/E90 (N)HXXH-O FE180/E30 JE-H(St)H FE180/E90 JE-H(St)H FE190/E30 LINCH FE180/E90
13.	Fabryka Kabli ELPAR Sp. z o.o. Ul. Laskowska 1 21-200 Parczew Poland	NHXX E90 NHXXCH E90 (N)HXXH E90 (N)HXXCH E90 HDGs E90 PH90 HTKSH FE180/PH90
14.	NKT Cables Group, Düsseldorfer Strasse 400, Chempark D-51061 Cologne Germany	NHXX E30 NHXXH E90
15.	VLG Cable Ukraine LLC Mixata str. 15 88015 Uzhhorod, Ukraine	(N)HXXH FE180 PH90/E90 0.6/1 kV (N)HXXH FE180 PH90/E30 0.6/1 kV JE-H(St)H FE180/E90 JE-H(St)H FE180/E30
16.	ERSE Kablo Halil Rifat Paşa Mh. Yuzer Havuz Sk. No: 5-9 Şişli / Istanbul Turkey	(N)HXXH FE180/E90 (N)HXXCH FE180/E90 JE-H(St)H Bd FE180/E90

1.1.1. Name and address of the manufacturing site

BAKS cable support structures are manufactured in the production plant:

- BAKS Wytwarzanie Osprzętu Instalacyjno-Elektrotechnicznego, Kazimierz Sielski, ul. Jagodne 5, 05-480 Karczew.

Cables and conductors are manufactured in the production plants:

- Zakłady Kablowe BITNER Sp. z o.o., ul. Krakowska 2, 32-353 Trzyciąż near Kraków,
- DÄTWYLER Kabel+Systeme GmbH, Lilienthalstrasse 17, DE-85399 Hallbergmoos,
- ELKOND HHK a.s., Oravicka 1228, 028 01 Trstena,
- Kabelwerk EUPEN AG, Malmedyer Str. 9, B-4700 Eupen,
- Jeans Deutschland Industries GmbH, Kabelkamp 20, 30179 Hannover,
- FACAB Lynen, Durener Str. 340, D-52249 Eschweiler,
- PRAKAB PRAŽSKÁ KABELOVNA, a.s. Ke Bablu 278, 102 09 Praha 15,
- LEONI STUDER Draht - und Kabelwerk AG, CH-4658 Daniken,
- Fabryka Kabli TECHNOKABEL in Sześćńsk, ul. Wiatraczna 28, 06- 550 Sześćńsk near Mława,
- TELE-FONIKA KABLE Sp. z o. o. S.K.A., ul. Wielicka 114, 30- 663 Kraków,
- Fabryka Kabli MADEX Stefanówka ul. Żurawia 96, 05-462 Wiązowna,

- KABLOTEK KABLO Alipasa mevkii Sanayi 12, Sokak No:7 Silivri - Istanbul,
- Fabryka Kabli ELPAR Sp. z o.o. ul. Laskowska 1, 21-200 Parczew,
- NKT cables s.r.o., Průmyslová 1130, 272 01 Kladno; NKT cables a/s, Toftegårdsvej 25, DK-4550 Asnaæs; NKT cables Vrchlabi s.r.o., Člen skupiny NKT, Českých bratři 509, 543 14 Vrchlabi,
- VLG; Transcarpathian Cable Factory LCC, 187 Peremohy str., Storozhnytsia village, Zakarpattia oblast., 894 41 Ukraine,
- ERSE Kablo, Ortaköy Sanayi Bölgesi Elif Sokak No:12 Selimpaşa - Silivri / Istanbul.

1.2. Classification

The cable support structures included in BAKS cable systems are made of materials depending on the method of protection against corrosive atmosphere. In the E30, E60, E90 systems, the products are available in four material versions:

- steel galvanised with the process in accordance with EN ISO 2081,
- steel galvanised with the Sendzimir process according to the PN-EN 10327 standard,
- hot dip galvanised steel PN-EN 1461,
- stainless steel in grades 1.4... (designation according to European standard EN 10088),
- Magnelis coated steel PN-EN 10346:2015-09,
- steel galvanised according to the zinc flake method, PN-EN ISO 10683:2014-09.

The above material versions can be additionally powder coated with polyurethane and epoxy paints or painted with acrylic paints.

Selected types and designations of cables included in the BAKS cable systems are presented in Table 3.

Table 3

Designation	Cable name
HTKSH	Telecommunications (T) station (S) cable (K), unshielded with single wire copper conductors and halogen-free flame retardant low smoking insulation (H) as well as halogen-free flame retardant low smoking sheathing (H)
HTKSHekw	Telecommunications (T) station (S) cable (K), shielded (ekw) with single wire copper conductors and halogen-free flame retardant low smoking insulation (H) as well as halogen-free flame retardant low smoking sheathing (H)
NHXH	Power cable (N) with copper conductors and double insulation made of mica strip and cross-linked halogen-free flame retardant, low smoking (HX) material as well as halogen-free flame retardant low smoking (H) filling and sheathing
NHXCH	Power cable (N) with copper conductors and double insulation made of mica strip and cross-linked halogen-free flame retardant, low smoking (HX) material as well as halogen-free flame retardant low smoking (H) filling and sheathing, with coaxial conductor in the form of a spiral-shaped wrapping on the filling (C)
(N)HXH	Power cable (N) with copper conductors and cross-linked flame retardant low smoking (HX) silicone rubber insulation; filler and outer sheath made of halogen-free flame retardant low smoking (H) material
(N)HXCH	Power cable (N) with copper conductors and cross-linked flame retardant low smoking (HX) silicone rubber insulation; filler and outer sheath made of halogen-free flame retardant low smoking (H) material. Cable with additional coaxial conductor in the form of a spiral-shaped wrapping on the filling (C)
JE-H(St)H	Telecommunications installation cable (JE), insulation and sheath made of halogen-free, flame retardant, low smoking (H) material, with a shared screen in the centre (St)
N2XH	Power cable (N) with copper conductors and cross-linked polyethylene (2X) core insulation, halogen-free flame retardant low smoking (H) filling and sheath
N2XCH	Power cable (N) with copper conductors and cross-linked polyethylene (2X) core insulation, halogen-free flame retardant low smoking (H) filling and sheath, with coaxial conductor in the form of a spiral-shaped wrapping on the filling (C)
HDGs	Cable with single-wire copper conductors (D) with special silicone rubber insulation (Gs) and halogen-free flame retardant low smoking (H) sheath
HDGsekw	Cable with single-wire copper conductors (D) with special silicone rubber insulation (Gs) and halogen-free flame retardant low smoking (H) sheath as well as a shared screen in the centre (ekw)
HLGs	Cable with multi-wire copper conductors (D) with special silicone rubber insulation (Gs) and halogen-free flame retardant low smoking (H) sheath
HLGsekw	Cable with multi-wire copper conductors (D) with special silicone rubber insulation (Gs) and halogen-free flame retardant low smoking (H) sheath as well as a shared screen in the centre (ekw)
PH 30 PH 90 PH 120	Cable ability to maintain circuit integrity (actual current conductivity or signal transmission) according to PN-B-02851-1 expressed in minutes (test according to EN 50200)
E 30 E 60 E 90	Ability of the cable system (cable/conductor + tray/ rack + support structure) to sustain electrical function expressed in minutes (test according to DIN 4102-12)
FE 180	Cable ability to maintain circuit integrity (actual current conductivity or signal transmission) expressed in minutes (test according to PN-IEC 60331-21 in static conditions at 750°C)

1.3. Marking

BAKS cable support structures are identified on the basis of the BAKS product catalogue. It is impossible to apply the product symbol on the elements due to the production technology; the products are mechanically marked only with the company logo or/and the product identification sticker.

Product marking appears on the component or on the packaging and provides the following information:

- Name and address of the manufacturer,
- Product symbol,
- Product article number,
- Packaging quantity.

Cable marking contains the following information:

- Cable symbol with the designation: (number of pairs) x (number of conductors in a pair) x (diameter of conductor),
- Trademark,
- Year of production.

2. INTENDED USE OF THE PRODUCT

2.1. Purpose

BAKS cable supporting structures together with power and telecommunication cables produced by the manufacturers listed in Table 2 of this CNBOP-PIB National Technical Assessment can be used as cable systems in power supply and control systems for fire protection devices in buildings.

The cable systems described in this CNBOP-PIB National technical assessment are classified as E30, E60, E90 circuit integrity maintenance class according to DIN 4102- 12, and according to § 187.3. of the Regulation of the Minister of Infrastructure of 12 April 2002 on the technical conditions to be met by buildings and their location (consolidated text Dz. U. No. 2022, item 1225), as ensuring continuity of electricity supply or signal transmission for the time required to start and operate the device, determined respectively at 30, 60 and 90 minutes.

The assessment of cable systems in terms of continuity of power supply or signal transmission, taking into account the type of substrate and the expected fixing method has been carried out in accordance with the conditions specified in the Polish Standard for fire resistance testing PN-EN 1363-1:2012 and PN-EN 1363-1:2020-07 Fire resistance tests - Part 1. General requirements and DIN 4102-12:1998 Fire performance of construction materials and components - Part 12: Maintenance of the circuit integrity of cable systems - Requirements and tests.

2.2. Usage scope and conditions

Conductors/cables and cable routes may be used in cable systems provided that:

- they meet the requirements of this CNBOP-PIB National Technical Assessment, which should be verified by positive results of tests of the cable system (cable with its attachment) according to annex 1, 2 or 3 of this CNBOP-PIB National Technical Assessment) according to the PN-EN 1363-1:2012/PN-EN 1363-1:2020-07 and DIN 4102-12:1998 standards, and
- cable manufacturers or suppliers performed conformity assessment of the product's performance, which resulted in the issuance of a certificate of conformity with the technical approval for the product or a national certificate of constancy of performance in conformity with the national technical assessment for the product.

Anchors/bolts/screws/nails of verified fire resistance can be used in cable systems. The verification must be appropriately documented, depending on the assessment system (for assessment system 1, the certificate of constancy of performance or the national certificate of constancy of performance, for the 2+ system, the certificate of conformity of the factory production control with the European Technical Assessment or the national certificate of conformity of the factory production control with the national technical assessment).

It is possible to lay fire-resistant cables together with non-fire-resistant cables in BAKS cable systems provided that the requirements described in the expert report MPA iBMB No. 2400/792/18-CM dated 25.10.2018 issued by Materialprüfanstalt für das Bauwesen (MPA Braunschweig), Beethovenstraße 52, 38106 Braunschweig (the report is valid until 25.10.2023) are met.

Annex 1 contains the drawings of standard BAKS cable support structures and classifications of cable systems according to DIN 4102-12:1998, depending on the used configuration of the standard cable supporting structure and cable.

Annex 2 contains the drawings of special BAKS cable support structures and classifications of cable systems according to DIN 4102-12:1998, depending on the used configuration of the special cable supporting structure and cable.

In Annex 3, since the DIN 4102-12:1998 standard does not provide for:

- E120 classification, Tables 1-19 present the result of the test in the form of the achieved duration of continuity of electricity supply under fire conditions, depending on the special cable support structure and cable configuration used,
- E classification for fibre optic cables, Tables 20-21 present the time taken to maintain adequate functionality, i.e. a maximum change in attenuation of $\leq 1\text{dB/m}$ for single-mode fibre optics and $\leq 2\text{dB/m}$ for multimode fibre optics (in accordance with PN-EN 50582:2016-12), depending on the special cable support structure and cable configuration used,

Annex 4 contains connection drawings for BAKS trays, cable racks, channel sections and mesh trays and their fixing method to support structures.

2.3. Use, installation and maintenance

BAKS cable systems must be fixed to a concrete substrate of class > C25 or natural stone. It is permitted to mount the cable systems to other substrates of adequate strength confirmed by the certificate of load bearing capacity equal at least to the resistance of the cable systems. Basic parameters for fixing trays are presented in Table 6.

Basic parameters for fixing racks are presented in Table 7.

Basic parameters for other fixing elements are presented in Table 8.

Basic parameters for fixing wire mesh trays are presented in Table 9.

2.3.1. Boundary conditions:

1. Brackets and extension brackets should be fixed to a solid ceiling or wall using certified anchor bolts selected to fit the substrate in accordance with the manufacturer's instructions,
2. M8, M10, M12 wall anchors and sleeves should be recessed in concrete at least 60 mm and M6 – at least 30 mm. The tension force per anchor should not exceed 500 N. Alternatively, anchors with verified fire safety specifications may be used. The installation instructions of the manufacturer of the approved anchors must be followed at all times,
3. When mounting the cable system to a concrete floor, a channel section must be used as an intermediate element between the channel and the floor. The channel must be firmly fixed to the ground and additionally twisted with the cable route. Distance between channels according to tables 6-9,
4. When laying cables or conductors with fire resistance rating E30 - E90 outside the building (outside a separated fire zone), it is necessary to use a weather-resistant cable routes that protect the cable installation against UV radiation. Cable segregation is to be maintained and the attachment to the ground is to ensure stability of the route,
5. Standard support structures using PGM threaded rods... should be made taking into account the permissible strength of the rods (Table 4); for E90 (6N/mm²) or E30-E60 (9N/mm²) structures,

Table 4

PERMISSIBLE LOAD FOR PGM THREADED RODS				
d	Rod cross-section [mm ²]	E30	E60	E90
Permissible PGM rod load [kg]				
M6	20.1	18	18	12
M8	36.6	33	33	22
M10	58	52	52	35
M12	84.3	76	76	50

6. It must be ensured that BAKS cable systems are not impaired in their circuit integrity maintenance class by falling construction elements,
7. BAKS cable systems can be made as suspended structures- fixed to ceilings and slab roofs, wall mounted horizontally, vertically or diagonally. Fastening to steel structures and sheet metal is also permitted.

2.3.2. Permitted for BAKS cable systems:

1. Fastening to another substrate of at least the same fire resistance class (fire resistance R30, R60, R90) as the cable system using certified anchors suitable for the substrate and load,
2. Use of anchoring components (nails, screws, sleeves, etc.) from other manufacturers with documented fire resistance and load-bearing capacity in the respective substrate,
3. Laying the cables in layers in a tray or rack while maintaining the permissible load for the E30-E90 cable route,
4. Fixing cables with metal brackets in halogen-free plastic strips and pipes,
5. Laying trays/racks up to 400 mm wide on horizontal CWP/CWOP40H40 or CMP41H41 channels with the maximum length of 2000 mm (for single level support structures only),
6. Laying trays/racks up to 400 mm wide on horizontal CWP40H22 or CMP41H21 channels with the maximum length of 500 mm,
7. Fixing of the BAKS PMO, PMPO and PMKO junction boxes directly to the sides of racks, trays and channels or by means of system clamps (details in a separate CNBOP-PIB National Technical Assessment),
8. Fixing fire protection system components not exceeding 3.5 kg (e.g. emergency light fixtures) to the base of the CWP/CWOP40H40 or CMP41H41 channel below the maximum load for the structure,
9. Fixing threaded rods directly to the substrate by means of appropriate, certified anchoring elements, using USV/USOV, US12/USO12 ceiling brackets or by means of WPPG, WPPGV/WPPOV, WKPO articulated rod hangers (only to walls),
10. Use of halogen-free plastic cable ties to separate cables/conductors on trays, racks and wire mesh trays,
11. Using, in place of a single tray or rack with the maximum width as shown in Annexes 1 and 2, two trays or racks, the total width of which should not exceed the maximum width as shown in the drawings, while maintaining other structural parameters as shown in the drawing (e.g. total load of both trays or racks must be less than or equal to the loads shown in the drawing),

12. Joining PGM threaded rods with NLM6, NLM8, NLM10, NLM12 connecting nuts locked with at least one NSM... nut (the maximum length of joined rods is not limited),
13. Making additional holes in KB-type solid trays in order to fix them to the support structure, connect them to other trays or fittings, attach a PMO, PMPO, PMKO junction box,
14. use of NO protective caps to protect the sharp edges of channels, racks, brackets and extension brackets,
15. Angled route laying (elevation change) using a support structure as shown in the figure 1 and 2. The sides of the trays and racks should be connected with LG... articulated connectors and the bases of the trays should be secured with BZK/BZKO... end plates. (does not apply to mesh trays),

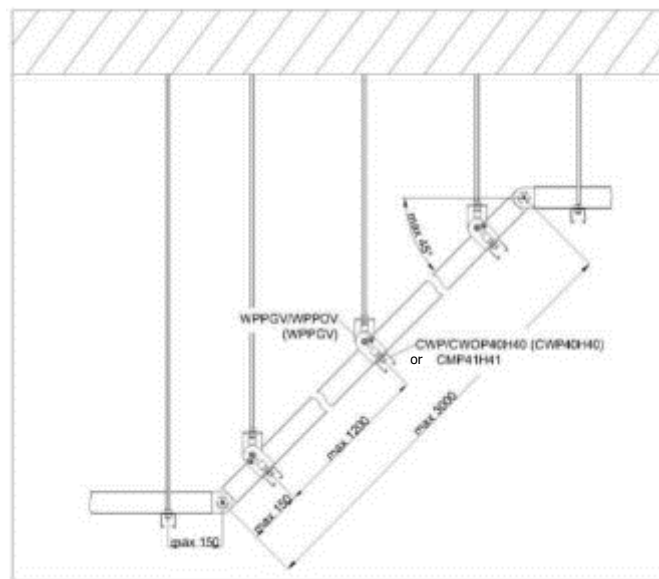


Figure 1. Angled route laying
Source: manufacturer's materials.

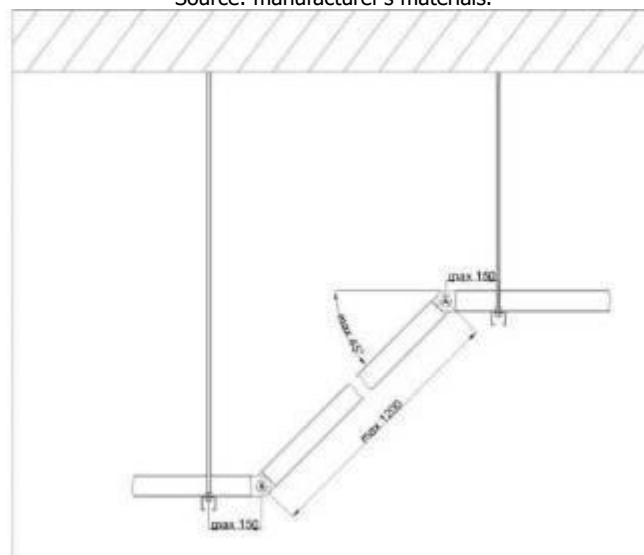


Figure 2. Angled route laying
Source: manufacturer's materials.

16. For special BAKS cable systems, it is permitted to use alternately trays/racks made of thicker sheet metal, according to Table 5 (strength parameters of trays/racks are transferred together with cable/conductor classification on tray/rack made of thinner sheet metal).

Table 5

Tray/rack type	Sheet thickness [mm]	Tray/rack type	Sheet thickness [mm]	Tray/rack type	Sheet thickness [mm]	Tray/rack type	Sheet thickness [mm]
KGL100H42	0.7	KGJ100H42	1.0				
KGL/KCL50H60	0.7	KGJ/KCJ50H60	1.0				
KGL/KGOL100H60	0.7	KGJ/KGOJ100H60	1.0				
KGL/KGOL150H60	0.7	KGJ/KGOJ150H60	1.0				
KGL/KGOL200H60	0.7	KGJ/KGOJ200H60	1.0				
KGL/KGOL300H60	0.7	KGJ/KGOJ300H60	1.0				
KCL100H42	0.7	KGJ100H42	1.0				
KGL/KCL50H60	0.7	KCJ/KCOJ50H60	1.0	KCD50H60	1.2	KCP50H60	1.5
KCL/KCOL100H60	0.7	KCJ/KCOJ100H60	1.0	KCD100H60	1.2	KCP/KCOP100H60	1.5
KCL/KCOL150H60	0.7	KCJ/KCOJ150H60	1.0	KCD150H60	1.2	KCP/KCOP150H60	1.5
KCL/KCOL200H60	0.7	KCJ/KCOJ200H60	1.0	KCD200H60	1.2	KCP/KCOP200H60	1.5
KCL/KCOL300H60	0.7	KCJ/KCOJ300H60	1.0	KCD300H60	1.2	KCP/KCOP300H60	1.5
		KCJ/KCOJ400H60	1.0	KCD400H60	1.2	KCP/KCOP400H60	1.5
KFL50H60	0.7	KFJ50H60	1.0				
KFL100H60	0.7	KFJ100H60	1.0				
KFL150H60	0.7	KFJ150H60	1.0				
KFL200H60	0.7	KFJ200H60	1.0				
KFL300H60	0.7	KFJ300H60	1.0				
KBL50H60	0.7	KBJ50H60	1.0	KBD50H60	1.2	KBP50H60	1.5
KBL100H60	0.7	KBJ100H60	1.0	KBD100H60	1.2	KBP100H60	1.5
KBL150H60	0.7	KBJ150H60	1.0	KBD150H60	1.2	KBP150H60	1.5
KBL200H60	0.7	KBJ200H60	1.0	KBD200H60	1.2	KBP200H60	1.5
KBL300H60	0.7	KBJ300H60	1.0	KBD300H60	1.2	KBP300H60	1.5
		KBJ400H60	1.0	KBD400H60	1.2	KBP400H60	1.5
DUD100H45	1.2	DUP100H45	1.5				
DUD200H45	1.2	DUP200H45	1.5				
DUD300H45	1.2	DUP300H45	1.5				
DUD400H45	1.2	DUP400H45	1.5				
DUJ100H60	1.0	DUD100H60	1.2	DUP/DUOP100H60	1.5		
DUJ200H60	1.0	DUD200H60	1.2	DUP/DUOP200H60	1.5		
DUJ300H60	1.0	DUD300H60	1.2	DUP/DUOP300H60	1.5		
DUJ400H60	1.0	DUD400H60	1.2	DUP/DUOP400H60	1.5		
		DUD500H60	1.2	DUP500H60	1.5		
		DUD600H60	1.2	DUP600H60	1.5		
DGOD100H60	1.2	DGOP100H60	1.5				
DGOD200H60	1.2	DGOP200H60	1.5				
DGOD300H60	1.2	DGOP300H60	1.5				
DGOD400H60	1.2	DGOP400H60	1.5				

17. Making fittings in mesh trays by cutting and joining appropriate wires - according to BAKS catalogue.
18. Fixing light fixtures with weight up to 20 kg made of non-combustible materials to horizontal channel sections forming part of the support structures (structure number 9 in Annex 2) provided that the permissible load of the structure is not exceeded.

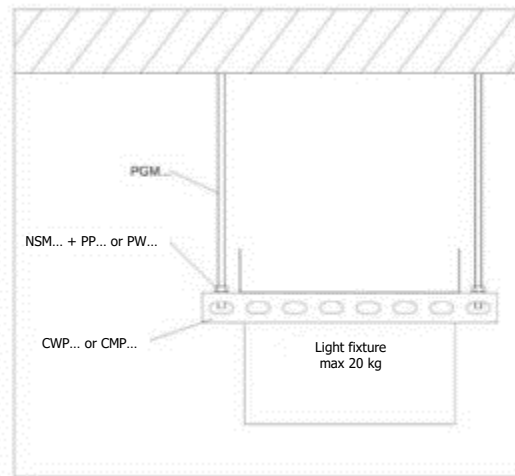


Figure 3. Fixing the light fixture to the cable route support structure
Source: manufacturer's materials.

2.3.3. Prohibited for BAKS cable systems:

1. Use of a shared support structure for a route constituting an E30-E90 cable system and a route without fire resistance functionalities,
2. Configure routes using elements from Table 1 but not included in Annexes 1 and 2,
3. Modify the shape of elements for making fittings (not applicable to wire mesh channels).
Fittings for perforated and solid trays and cable racks must be made using the provided system elements. Changing route level (elevation change) should be carried out with the use of hinged connectors. Tray edges should be protected with end plates or protective tape.

The permissible loads and technical parameters of BAKS cable support structures should be in accordance with Tables 6- 9.

Table 6

BASIC TRAY FIXING PARAMETERS		
	Symbol	Sheet th.
Tray types	KGL/KCL50H60 *	0.7 mm
	KCL100 - 300H60, KCL/KCOL100 -300H60 *	0.7 mm
	KLFL75H60 *	0.7 mm
	KGL100H42 *	0.7 mm
	KGL100 - 300H60, KGL/KGOL100 - 300H60 *	0.7 mm
	KFL50H60 *	0.7 mm
	KFL100-300H60 *	0.7 mm
	KBL100-300H60 *	0.7 mm
	KCJ100 - 400H60, KCJ/KCOJ100 - 400H60 *	1.0 mm
	KGJ100 - 400H60, KGJ/KGOJ100 - 400H60 *	1.0 mm
	KFJ100-400H60 *	1.0 mm
	KBJ100-400H60 *	1.0 mm
	KCD100 - 400H60, KCD/KCOD100 - 400H60 *	1.2 mm
	KCP100 - 600H60, KCP/KCOP100 - 600H60	1.5 mm
Permitted tray perforation	15 ± 5% Not applicable to KB... trays	
CONNECTING TRAYS (details in Annex 4)		
Up to (including) 1.2 mm sheet thickness by means of insertion and screwing with M6 bolts (Annex 4)		
Up to (including) 1.5 mm sheet thickness by means of connectors, connecting plates and M6 bolts (Annex 4)		
Connector type	LPPH, LPP/LPOPH60N, LPLPH60, LPU.	
Type of connecting plate depending on the width of the tray	BL100 - 600, BL/BLO100 - 600N	
Connecting bolt type	Bolts: SGNM6x12 or SGKM6x12 in cl.5.8	
HORIZONTAL TRAYS FIXING (details in Annex 1 and 2)		
Max. tray load	2 kg/m *, 5 kg/m *, 10 kg/m, 20 kg/m *. 25 kg/m *	
Max. support spacing	1.2 m; 1.5 m*; 1.7 m*	
Method of fixing to the support structure	Fixing as shown in the drawings in Annexes 1, 2, 4	
Max. number of route levels per structure	3 levels, 4 levels (for structure no 32 and 33 according to Annex 2)	
Max. tray width or sum of tray widths	600 mm *	
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system	
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *	
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO..., SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM..., PGLO... Or other anchoring elements with proven fire resistance and load-bearing capacity	
Fixing to steel structure	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Clamp ZK..., ZC... Threaded rod PGM..., Hold down clamp UDC Channel CWP/CWOP... Clamp OBRK... (In accordance with Annex 2)	
Fixing to trapezoidal sheet	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Trapeze hanger WT... + PGM... rod hanger pin (In accordance with Annex 2)	
Fixing to pipe structures	Pipe clamp OBR... Reinforced channel CWP/CWOP40H40 (CWP40H40) or/and CMP41H41 (In accordance with Annex 2)	
Fixing cables/conductors to the trav	not required	

Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results
VERTICAL TRAY FIXING* (details in Annex 2 - structure 86)	
Bracket type	UT
Max. tray load	20 kg/m
Max. support spacing	1.5 m
Fixing tray to bracket	Bolts: SGNM6x12 or SGK6x12 in cl.5.8
Max. tray width	400 mm
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C25 or other substrate with the required fire resistance *
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete, plasterboard structure	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO..., SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM... Or other anchoring elements with proven fire resistance
Fixing cables/conductors to the tray	Brackets UDF, UEF max. every 600 mm
Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results

* – special constructions

Table 7

BASIC RACK FIXING PARAMETERS		
	Symbol	Sheet th.
Rack types	DUJ100-400H60 *	1.0 mm
	DGOD100-400H60 *	1.2 mm
	DUD100-400H45 *	1.2 mm
	DUD100-600H60 *	1.2 mm
	DUP100-600H60 *	1.5 mm
	DUP/DUOP100-600H60 *	1.5 mm
	DGOP100 - 600H60	1.5 mm
	DFP100-400H60 *	1.5 mm
	DUVC100-600H60 *	2.0 mm
Max. rungs spacing	150 mm; 300 mm*	
CONNECTING RACKS (details in Annex 4)		
With connectors, screwed with M8 bolts (Annex 4)		
Connector type	LDCH45, LDCH60, LDC/LDOCH60N	
Connecting bolt type	Bolts: SGNM8x14 or SGKM8x14 in cl.5.8 - 4 pcs. per LDC/LDOCH60N (LDCH60) connector	
HORIZONTAL RACKS FIXING (details in Annex 1 and 2)		
Max. rack load	10 kg/m; 20 kg/m; 25 kg/m*; 30 kg/m*, 40 kg/m*	
Max. support spacing	1.2 m; 1.5 m*; 1.7 m*;	
Fixing rack to support structure	ZM/ZMO (ZM) clamp as shown in the drawings (Annex 4) - 1 pc. for width of 100 mm - 2 pcs. for width of 200 - 600 mm	
Number of route levels per structure	3 levels, 4 levels (for structure no 32 and 33 according to Annex 2)	
Max. rack width or sum of rack widths	600 mm *	

Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO..., SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM..., PGLO... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Clamp ZK..., ZC... Threaded rod PGM... Hold down clamp UDC Channel CWP/CWOP... (CWP...) Clamp OBRK... (In accordance with Annex 2)
Fixing to trapezoidal sheet	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Trapeze hanger WT... + PGM... rod hanger pin (In accordance with Annex 2)
Fixing cables/conductors to the rack	Not required (structure 23 and structure 40 - fixing as for vertical systems)
Fixing to pipe structures	Pipe clamp OBR... Reinforced channel CWP/CWOP40H40 (CWP40H40) or/and CMP41H41 (In accordance with Annex 2)
Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results
VERTICAL RACKS FIXING (details in Annex 1 and 2)	
Bracket type	UTM/UTMO (UTM), UT, LCKD
Max. rack load	20 kg/m;
Max. bracket spacing	1.2 m; 1.5 m*; 3.5 m*
Fixing rack to bracket	Bolts: SGNM8x14 or SGK M8x14 in cl.5.8
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete, plasterboard structure	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO..., SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM..., PGLO... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure*	Threaded rod PGM... Hold down clamp UDC Triangular bracket UTM/UTMO (UTM), UT or LCKD Channel CWP/CWOP... (CWP...) or CMP41H41... (In accordance with Annex 2)
Fixing cables on rack	Fix the cables max. every 300 mm or every 600 mm* using brackets: UK1/UKO1...(UK1...)-max. number of cables in one bracket 3 pcs. or 5 pcs. up to 20 mm diameter

	UK1/UKO2...(UK2...)-max. number of cables in one bracket 3 pcs. or 5 pcs. up to 20 mm diameter (permitted use of RO1... protection trays)
Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.

* – special constructions

Table 8

BASIC MESH TRAY FIXING PARAMETERS*	
	Galvanised steel rod
Mesh tray types	KDS/KDSO60 - 600H60 KSG60 - 600H60 KDSZ60 - 400H60 KGS60 - 100H60
Wire diameter	Ø 4- 5 mm
CONNECTING MESH TRAYS (details in Annex 4)	
Connector type	Joint connector USSN, USSN/USSO Joint connector USSPW, USSPW/USSPWO Joint connector USSW, USSW/USSWO*
HORIZONTAL MESH TRAYS FIXING (details in Annex 2)	
Max. mesh tray load	20 kg/m - KDS/KDSO100-600H60 (KDS100-600H60), KSG100-600H60, KDSZ100-400H60 2 kg/m - KDS/KDSO60H60 (KDS60H60), KSG60H60, KDSZ60H60 5 kg/m- KGS60-100H60
Max. support spacing	1.5 m
Mesh tray fixing	- Clamp ZS/ZSO (ZS) - Hanger WKS/WKSO60 (WKS60) - Clamp ZSW - Joint connector USSPW/USSPWO (USSPW) - Bracket USSP - Bracket USKPH... - mounting profile PMC/PMCO (PMC) - mesh tray bracket USK, USKH...
Number of route levels per structure	3 levels, 4 levels (for structure no 32 and 33 according to Annex 2)
Max. mesh tray width or sum of mesh tray widths	600 mm
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO, SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM..., PGLO... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Clamp ZK..., ZC... Threaded rod PGM... Hold down clamp UDC Channel CWP/CWOP... (CWP...) (In accordance with Annex 2)
Fixing to trapezoidal sheet	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Trapeze hanger WT... + PGM... rod hanger pin (In accordance with Annex 2)
Fixing to pipe structures	Pipe clamp OBR... Reinforced channel CWP/CWOP40H40/... (CWP40H40/...) or/and CMP41H41 (In accordance with Annex 2)
Fixing cables/conductors to the tray	Not required (structure 21 and structure 24 - fixing as for vertical systems)

Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.
VERTICAL MESH TRAYS FIXING (details in Annex 2)	
Bracket type	mounting profile PMC/PMCO (PMC), WKS, WKS/WKSO60, USKH100
Max. tray load	20 kg/m - KDS/KDSO100-600H60 (KDS100-600H60), KSG100-600H60 2 kg/m - KDS/KDSO60H60 (KDS60H60), KSG60H60
Max. support spacing	1.5 m
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance
Fixing to substrate: concrete, cracked concrete, stone, solid brick, duct brick, duct concrete, SILKA brick, porotherm, aerated concrete, plasterboard structure	Expansion bolts PSROM..., SRO..., SRBO..., PSRZ..., SKT..., Concrete bolts SBO..., SBSO... Anchor bolts MKR..., KRN... Expansion sleeve TRSO..., TRSK..., KSKO... Anchors KSSKO..., GSO..., KWBO... Chemical anchors PGS..., AS, ZI300 Threaded rods PGM... (through wall) Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing cables to the mesh tray	Fix the cables max. every 600 mm using brackets: UKZ1/UKZO1... (UKZ1...) - max. number of cables in one bracket 3 pcs. or 5 pcs. up to 20 mm diameter
Max. load for bolts, threaded rods, sleeves and anchor bolts in E30, E60 system	9 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.
Max. load for bolts, threaded rods, sleeves and anchor bolts in E90 system	6 N/mm ² of bolt (rod) cross-section – For standard solutions. For special solutions, loads according to test results.

* – special constructions

Table 9

BASIC CABLE BRACKETS AND CLAMPS FIXING PARAMETERS CEILING OR WALL MOUNTING	
CABLE CLAMPS AND BRACKETS - VERTICAL AND HORIZONTAL CABLE/CONDUCTOR ROUTING (details in Annex 1 and 2)	
Clamp/bracket types	UDF..., UDFB... UEF..., UEFB... KSA...
Cable diameters possible to install on brackets	Diameter: from Ø5 mm to Ø42 mm for: UDF..., UDFB..., UEF..., UEFB...; Diameter: from Ø5 mm to Ø55 mm for: KSA... max. number of cables per KSA clamp 3 pcs. with diameters from 20 mm or 5 pcs. with diameters up to 20 mm
Max. bracket spacing	300 mm; 600 mm*, 800 mm*
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *

Fixing to substrate: concrete, cracked concrete, stone, solid brick, aerated concrete, silicate, plasterboard, duct brick, duct concrete, SILKA brick, porotherm	Anchor bolts SR0M... Anchor bolts SRB0M... Expansion bolt PSR0M... Sleeve TRS0M... + threaded rod PGM... Sleeve TRSK... + threaded rod PGM... Frame anchor KR0N... Expansion anchor GS0... Nail anchor KWBO... Concrete bolts SBO..., SBSO... Concrete screw WDB... Anchor Bolt SKTO..., SKTZO... Metal anchor bolt MKR... Plasterboard anchor KKG... Anchor KSKO..., KSSKO... Threaded rods PGM..., PGLO... Cartridge nails GWT... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure	Clamp ZK..., ZC..., ZSU3 Self-drilling screw SMD ... (or other anchoring elements with proven fire resistance and load bearing capacity) Nail gun nails GWTS... (or other anchoring elements with proven fire resistance and load bearing capacity)
Fixing to sheet metal	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Trapeze hanger WT... + PGM... rod hanger pin
CABLE CLAMPS - HORIZONTAL CABLE/CONDUCTOR ROUTING (details in Annex 1 and 2)	
Types of clamps	OZ/OZO (OZ) OZS/OZSO (OZS) OZM/OZMO (OZM)
Max. load capacity	OZ/OZO (OZ) - 6 kg/m OZS/OZSO (OZS) - 2 kg/m OZM/OZMO (OZM) - 1 kg/m
Max. clamp spacing	300 mm; 600 mm*, 800 mm*
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *
Fixing to substrate: concrete, cracked concrete, stone, solid brick, aerated concrete, silicate, plasterboard, duct brick, duct concrete, SILKA brick, porotherm	Anchor bolts SR0M... Anchor bolts SRB0M... Expansion bolt PSR0M... Sleeve TRS0M... + threaded rod PGM... Sleeve TRSK... + threaded rod PGM... Frame anchor KR0N... Expansion anchor GS0... Nail anchor KWBO... Concrete bolts SBO..., SBSO... Concrete screw WDB... Anchor Bolt SKTO..., SKTZO... Metal anchor bolt MKR... Plasterboard anchor KKG... Anchor KSKO..., KSSKO... Threaded rods PGM..., PGLO... Cartridge nails GWT... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure	Clamp ZK..., ZC... Self-drilling screw SMD ... (or other anchoring elements with proven fire resistance and load bearing capacity) Nail gun nails GWTS... (or other anchoring elements with proven fire resistance and load bearing capacity)
Fixing to sheet metal	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity) Trapeze hanger WT... + PGM... rod hanger pin
RACK RUNK FIXING (details in Annex 1 and 2)	
Rung type	SDP/SDOP... (SDP...), SDC/SDOC... (SDC...), CMSC41H21...
Rung fixing	Maximum spacing between rung anchors – 250 mm
Max. rungs spacing	300 mm; 600 mm*, 800 mm*
Cable routes location	The location of cable routes must be designed/installed in such a way as to exclude negative impacts from other building elements or equipment which could lead to damage to the cable system
Substrate type	Concrete class min. B20/C16-C20 or other substrate with the required fire resistance *

Fixing cables on rung	Fix the cables max. every 300 mm or every 600 mm* using brackets: UK1/UKO1... (UK1...) - max. number of cables in one bracket UKO1... (UK1...) - 3pcs. or 5pcs. up to 20 mm diameter UK1/ UKO2...(UK2...)-max. number of cables in one bracket UKO2...(UK2...) - 3 pcs. or 5 pcs. up to 20 mm diameter (permitted use of RO1... protection trays)
Fixing to substrate: concrete, stone, solid brick, aerated concrete, silicate, plasterboard, duct brick, duct concrete, SILKA brick, porotherm, steel structure elements	Anchor bolts SROM... Anchor bolts SRBOM... Expansion bolt PSROM... Frame anchor KRN... Expansion anchor GSO... Nail anchor KWBO... Concrete bolts SBO..., SBSO... Concrete screw WDB... Metal anchor bolt MKR... Plasterboard anchor KKG... Anchor KSKO..., KSSKO... Threaded rods PGM..., PGLO... Or other anchoring elements with proven fire resistance and load-bearing capacity
Fixing to steel structure	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity)
Fixing to sheet metal	Self-drilling screw SMD... (or other anchoring elements with proven fire resistance and load-bearing capacity)

* – special constructions

3. PRODUCT PERFORMANCE CHARACTERISTICS AND METHODS APPLIED TO THEIR ASSESSMENT

3.1. Maintenance of the circuit integrity of cable systems

Table 50

No.	Properties	Requirements	Test methods
1.	Maintenance of the circuit integrity of cable systems (ensuring continuity of power supply or signal transmission for the time required for the starting and operation of the fire protection device)	Class E30, E60, E90 according to DIN 4102- 12:1998 30, 60 and 90 minutes according to Polish regulations	PN-EN 1363-1:2012/ PN-EN 1363-1:2020-07 and DIN 4102-12:1998

4. PACKAGING, TRANSPORT, STORAGE AND MARKING OF THE CONSTRUCTION PRODUCT

4.1. Packaging

BAKS cable support structures

The elements of BAKS cable support structures should be placed in unit or collective packaging protecting them against mechanical and environmental damage, and then transport packaging, limiting the possibility of free movement and protecting them against damage during handling and transport.

The following information should appear on the packaging:

- name of the manufacturer;
- product symbol;
- Product article number;
- number of structural elements units in the package (for collective packaging).

Cables

Manufacturing sections of cables should be provided with tight ends.

Cables should be packaged in accordance with the requirements of the PN-E-79100 standard.

4.2. Transport

BAKS cable support structures

The transport of BAKS support structure elements packed in accordance with point 4.1 may be carried out by any means of transport. The components of the support structure must be protected against mechanical damage and against relative humidity higher than 95 % at +40 °C in accordance with the requirements of the applicable transport regulations.

Cables

Cables should be transported in accordance with the requirements of PN-E-79100 standard.

4.3. Storage

BAKS cable support structures

Store the components of BAKS support structures according to the following conditions:

1. Delivered state products (i.e. in original BAKS packaging) must be stored in dry and ventilated rooms,
2. During storage, protect against rapid changes in air humidity and temperature, which may cause condensation of water vapour. Failure to do so may result in white spots (zinc oxides),
3. If it is necessary to place the products in the open air for a short period of time, moisture drainage must be provided. Use a cover ensuring air circulation,
4. Should the products get wet, they must be dried (separate pieces, so that they do not come into contact with each other and placed in a dry, well-ventilated place until they are completely dry) before storage.

Cables

Cables should be packaged in accordance with the requirements of the PN-E-79100 standard.

4.4. Marking of the construction product

The marking of the construction product and its packaging, before it is placed on the market, should contain the information required in this CNBOP-PIB National Technical Assessment.

4.4.1. Marking of the construction product

Product marking should be carried out in accordance with the guidelines contained in the Regulation of the Minister of Infrastructure of 17 November 2016 on the manner of declaring the performance of construction products and the manner of marking them with the construction mark (Journal of Laws 2016, item 1966, as amended):

§ 10.

- 1) The manufacturer shall mark the construction product with the construction mark before placing it in circulation or making it available on the national market.
- 2) The construction mark shall be affixed in a visible, readable and permanent manner either directly to the construction product or to a label affixed to that product.
- 3) Where it is not possible to affix the construction mark as specified in paragraph 2, due to the size or the nature of the construction product, that mark shall be affixed to the unit or collective packaging or documents accompanying the construction product.

§ 11.1.

The marking of a construction product with a construction mark shall be accompanied by the following information:

- 1) the last two digits of the year in which the construction mark was first affixed to the construction product;
- 2) the manufacturer's name and registered office or an identification mark enabling the manufacturer's name and registered office to be clearly identified;
- 3) name and type designation of the construction product;
- 4) the number and year of issue of the National technical assessment according to which the performance was declared;
- 5) the number of the national declaration of performance;
- 6) the level or class of the declared performance;
- 7) the name of the certification body that participated in the assessment and verification of constancy of performance of the construction product;
- 8) the address of the manufacturer's website if the national declaration of performance is made available on it.

§12.

A construction product bearing a construction mark may bear other markings, signs and inscriptions, provided that they do not impair the visibility and legibility of the construction mark and of the information referred to in § 11 and that their meaning and graphic form are not misleading.

4.4.2. Marking by type, characteristics and intended use of the product

BAKS cable support structures are identified on the basis of the product catalogue. It is not possible to apply the product symbol to all components due to production technology.

4.4.3. Labelling of product packaging by type, characteristics, intended use:

The packaging of the product which is the subject of this National Technical Assessment shall contain at least the following information:

- Construction mark, conditionally in accordance with the guidelines in section 4.4.1;
- name or logo of the manufacturer;
- product code;

- product name;
- number of pieces per package.

5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

5.1. General principles

In accordance with Article 4, Article 5(2) and Article 8(1) of the Act of 16 April 2004 on construction products (Dz. U. 2021, item 1213), a product to which this CNBOP-PIB National Technical Assessment refers may be placed on the market and used in the performance of construction works to the extent corresponding to its functional properties and intended use, if the manufacturer has assessed and verified the constancy of performance and by issuing a national declaration of performance of the construction product has declared that, under his sole responsibility, the product performance complies with the **National Technical Assessment CNBOP–PIB Nr CNBOP-PIB-KOT-2023/0371- 3703 Issue 2** and affixed the construction mark to the product.

In accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the methods of declaring the performance of construction products and the method of marking them with a construction mark (Dz. U. of 2016, item 1966, as amended), the assessment and verification of the constancy of performance **of BAKS cable systems (cable support structures with electric conductors and cables) with the circuit integrity maintenance class of E30, E60, E90 according to DIN 4102- 12 is performed by the manufacturer using system 1+ of assessment and verification of constancy of performance** meaning a certification of conformity of the product performance characteristics by an accredited certification body on the basis of:

- 1) the activities of the manufacturer, including the determination of the type of construction product and maintenance of:
 - a) factory production control system,
 - b) testing of samples collected at the factory by the manufacturer in accordance with a prescribed test plan;
- 2) the assessment and verification carried out by an accredited certification body shall include:
 - a) initial inspection of the manufacturing plant and factory production control,
 - b) issuance of a national certificate of constancy of performance,
 - c) continuous surveillance, assessment and evaluation of factory production control,
 - d) carrying out control tests on samples taken by the certification body at the manufacturing plant or in the manufacturer's storage facilities.

5.2. Factory production control (FPC)

5.2.1. General provisions

The manufacturer must establish, document and maintain a system of FPC to ensure that the products placed on the market conform to the prescribed performance.

The FPC system shall include written procedures, regular inspections and testing and/or assessment and the use of results to control raw materials and other incoming materials or components, equipment, the manufacturing process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic and orderly manner in the form of written policies and procedures. Such documentation of the production control system should ensure a common understanding of the conformity assessment and enable the required performance of the product to be achieved and should enable the effective operation of the production control system to be verified.

The factory production control simultaneously uses operating techniques and all the actions allowing to maintain and control the conformity of the product with this National Technical Assessment.

5.2.2. Requirements

The construction product subject to this National Technical Assessment should be manufactured according to the factory production control system.

The manufacturer must establish, document, implement and maintain a factory production control system in order to ensure the constancy of performance of the construction product as specified in this CNBOP-PIB National Technical Assessment.

The documentation of the factory production control shall include:

- a) organisational structure,
- b) requirements for personnel (qualifications, authorisations, responsibility for particular elements of the factory production control, training),
- c) management reviews performed by the management,
- d) supervision of documentation and records,
- e) plans for inspections and testing of raw materials, requirements,
- f) plans for inspections and testing of the finished product,
- g) supervision over the equipment used for production,
- h) supervision over equipment used for the inspections and testing with the maintenance of measurement coherence,
- i) supervision over the manufacturing process, including the conduct of inter-process tests and inspections,
- j) description of subcontracted work and the procedure for its supervision,
- k) handling of non-compliant product and complaints, implementation of corrective actions,
- l) description of product packaging, transport, storage and marking methods.

The documentation of factory production control should be supplemented with technical documentation, technical specifications (product standards, test standards, European or national technical assessments, etc.), legal regulations.

The quality management system applied by the requirements of PN-EN ISO 9001 can be considered a factory production control system if the requirements of this CNBOP-PIB National Technical Approval are also met.

5.3. Initial type testing

The initial type testing confirms the required performance of the construction product, carried out before placing it on the market and use of the product as well as whenever there is a change in the raw material or in the components or production technology, as well as changes in the FPC system, in situations where they affect the performance of the product.

On the basis of the **system 1+ of assessment and verification of constancy of performance** adopted for the product covered by this National Technical Assessment and in accordance with § 5 of the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Dz. U. of 2016, item 1968) initial type testing should be performed by:

1. Accredited testing laboratory in accordance with the Act of 13 April 2016 on conformity assessment and market supervision systems or;
2. Foreign laboratory if required by international agreements or;
3. Notified laboratory in accordance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC or;
4. Other laboratory with which the assessment unit has signed an agreement involving the acceptance of the results of tests and calculations.

The assessment unit may accept the results of tests and calculations conducted by domestic or foreign laboratories other than those listed above, as delivered by the applicant.

The scope of the initial type testing shall be all the tests prescribed in section 3.

Positive results of tests carried out in accredited laboratories which in the procedure of **CNBOP-PIB National Technical Assessment No CNBOP-PIB-KOT-2023/0371- 3703, issue 2** were the basis for determining the performance of the product, may be considered as the initial type examination in the assessment and verification of the constancy of performance of the product.

5.4. End product testing

The testing plan for end products includes ongoing tests, periodic tests and control tests.

5.4.1. Ongoing tests

Ongoing tests constitute an internal production control measure as a result of which the manufacturer ensures compliance of the technical properties of the product with the findings of the National Technical Assessment.

Testing scope according to Table 11.

Table 11

No.	Test type	Requirements	Test method
1	External appearance, dimensions, marking	According to the manufacturer's documentation	Check

The results of ongoing tests should be systematically recorded and the records of the register should confirm that the products meet the criteria of conformity assessment. Each batch should be uniquely identifiable in the test record.

The manufacturer should indicate in the factory production control documentation what percentage (no less than 1 per cent) of the product samples will be used for ongoing testing. If there are different varieties (versions) of the product within a batch, then the tests must be carried out for each variety.

5.4.2. Periodic tests

The tests should be carried out in order to periodically check the quality of products and to confirm the stability of production, at least once every 3 years.

Testing scope according to Table 12.

Table 12

No.	Test type	Requirements	Test method
1	External appearance, dimensions, marking	According to the manufacturer's documentation	Check
2	Maintenance of the circuit integrity of cable systems* (ensuring continuity of power supply or signal transmission for the time required for the starting and operation of the fire protection device)	Class E30, E60, E90 according to DIN 4102-12:1998 30, 60 and 90 minutes according to Polish regulations	PN-EN 1363-1:2020-07 and DIN 4102-12:1998

* The test must be carried out when changes are made to the design covered by this National Technical Assessment

5.4.3. Control tests

In accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring the performance of construction products and the method of marking them with the construction mark (Journal of Laws 2016, item 1966, as amended) and the system 1+ of assessment and verification of constancy of performance defined for the product covered by this CNBOP-PIB National Technical Assessment, control tests of the product should be carried out.

Control tests should be carried out at least once every 3 years.

Testing scope according to Table 13.

Table 13

No.	Test type	Requirements	Test method
1	External appearance, dimensions, marking	According to the manufacturer's documentation	Check

5.5. Test methods

Testing of the products should be carried out in accordance with the methods specified in section 3 and 5.4 of this CNBOP- PIB National Technical Assessment. The obtained results shall be compared with the requirements set out in this point. During sample collection, sample preparation and testing, the environmental conditions specified in the normative documents listed in section 3 and 5.4 of this CNBOP-PIB National Technical Assessment should be ensured.

5.6. Collection of samples for tests

Samples for testing should be taken at random, in accordance with PN-N-03010 or any other equivalent standard.

5.7. Evaluation of test results

Manufactured products should be considered compliant with the requirements of this CNBOP-PIB National Technical Assessment if the results of all tests included in section 3 are positive. Results from previous tests carried out in accredited laboratories should also be taken into account in the evaluation

of the results if the test methods and the exposure conditions are in accordance with the requirements of this CNBOP-PIB National Technical Assessment.

6. LEGAL INSTRUCTION

- 6.1.** The CNBOP-PIB National Technical Assessment **CNBOP- PIB CNBOP-PIB-KOT-2023/0371-3703 issue 2** is a document confirming the positive assessment of the performance for the intended use of the product named **BAKS cable systems (cable support structures with electric conductors and cables) with the circuit integrity maintenance class of E30, E60, E90 according to DIN 4102- 12:1998** in the scope resulting from the provisions of this CNBOP-PIB National Technical Assessment.
- 6.2.** The set of performance characteristics recorded in the CNBOP-PIB National Technical Assessment and their required level constitute the basis for assessment and verification of constancy of performance by the manufacturer and for issuing, under his sole responsibility, a national declaration of performance.
- 6.3.** The CNBOP-PIB National Technical Assessment **CNBOP- PIB CNBOP-PIB-KOT-2023/0371-3703 issue 2** confirms the positive assessment of the product as manufactured by the Applicant and submitted to the procedure for issuing the CNBOP-PIB National Technical Assessment. The procedure for issuing the CNBOP-PIB National Technical Assessment does not change or correct the product by assigning to it requirements other than those declared by the Manufacturer and other means of testing the performance than those which are actually used in the production process of the product in type testing and ongoing production control.
- 6.4.** The CNBOP-PIB National Technical Approval is not a document authorising the marking of the construction product before market introduction.
- 6.5.** The product shall be delivered to the consignee in accordance with the packaging, storage and transport conditions specified in section 4 of this CNBOP-PIB National Technical Assessment. This condition applies to the Supplier at all stages of product distribution from the manufacturer to the end user.
- 6.6.** The CNBOP-PIB National Technical Assessment does not relieve the manufacturer of products from responsibility for the proper quality of each batch and single unit, and contractors of construction works from responsibility for their proper use.
- 6.7.** The guarantee for the construction product, which is the subject of this CNBOP-PIB National Technical Assessment, shall be granted by the Supplier on the basis of separate regulations.
- 6.8.** The content of leaflets, announcements and other documents related to the marketing and use of the product covered by this CNBOP-PIB National Technical Assessment in the construction industry should include information about the CNBOP-PIB National Technical Assessment issued for this product: **CNBOP-PIB-KOT-2023/0371-3703 issue 2**.

- 6.9.** The CNBOP-PIB National Technical Assessment does not infringe on the rights resulting from the provisions on industrial property protection, and in particular from the announcement of the Marshal of the Sejm of the Republic of Poland of 30 June 2000 – Industrial Property Law (consolidated text Dz. U. 2001, item 324). The assurance of these rights is the responsibility of the users of this CNBOP-PIB National Technical Assessment.
- 6.10.** It is the responsibility of the manufacturer to check that the solution which is the subject of the CNBOP-PIB National Technical Assessment does not infringe the rights of third parties.
- 6.11.** Liability for damage caused to anyone by a defect in the product shall be borne by the Manufacturer.
- 6.12.** In relation to the issue of this CNBOP-PIB National Technical Assessment, CNBOP-PIB shall not be held liable for any possible infringement of exclusive and acquired rights.
- 6.13.** CNBOP-PIB may make changes in the performance properties specified in this CNBOP-PIB National Technical Assessment. This shall require a written request, supported by reasons, from the manufacturer and an investigation as appropriate to the changes in scope. It is unacceptable to introduce any changes to the content of the CNBOP-PIB National Technical Assessment made in a manner other than that specified above.
- 6.14.** The CNBOP-PIB National Technical Assessment may be waived by the CNBOP-PIB in case of changes in separate regulations, standards and regulations established by international organisations, if it results from the concluded contracts, significant changes in the scientific basis and the state of practical knowledge and if the positive assessment of the performance properties of the construction product used for its intended purpose is not confirmed in the course of its application. The CNBOP-PIB National Technical Assessment may be repealed on the CNBOP-PIB's own initiative or at the request of the Chief Inspector of Construction Supervision, after an investigation with the participation of the applicant.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

Related documents and standards

PN-EN 1363-1:2012

Fire resistance tests - Part 1: General requirements

PN-EN 1363-1:2020-07

Fire resistance tests - Part 1: General requirements

DIN 4102-2:1997

Fire performance of construction materials and components - Part 2: Construction components, definitions, requirements and tests

DIN 4102-4:2016

Fire performance of construction materials and components - Part 4: Listing and use of classified construction materials, construction components and special construction components

DIN 4102-12:1998

Fire performance of construction materials and components - Part 12: Maintenance of the circuit integrity of cable systems - Requirements and tests

PN-EN 50582:2016-12

Procedure for assessing the continuity of a circuit in a fibre optic cable during a fire resistance test of the cable

PN-E-79100:2001

Electric cables and conductors - Packaging, storage and transportation

PN-N-03010:1983

Statistical quality control - Random selection of product units for sampling

Reports, test reports, assessments, classifications used in the procedure for issuing the National Technical Assessment

Test reports:

1. No. FIRES-FR-054-06-AUNE of 23/06/2006
2. No. FIRES-FR-109-06-AUNE of 09/10/2006
3. No. FIRES-FR-160-06-AUNE of 08/12/2006
4. No. FIRES-FR-040-07-AUNE of 19/03/2007
5. No. FIRES-FR-086-07-AUNE of 19/06/2007
6. No. FIRES-FR-102-07-AUNE of 12/07/2007
7. No. FIRES-FR-129-07-AUNE of 03/08/2007
8. No. FIRES-FR-162-07-AUNE of 20/09/2007
9. No. FIRES-FR-202-07-AUNE of 22/11/2007
10. No. FIRES-FR-234-07-AUNE of 07/01/2008
11. No. FIRES-FR-235-07-AUNE of 14/01/2008
12. No. FIRES-FR-012-08-AUNE of 07/02/2008
13. No. FIRES-FR-061-08-AUNE of 27/05/2008
14. No. FIRES-FR-063-08-AUNE of 27/05/2008
15. No. FIRES-FR-151-08-AUNE of 27/08/2008
16. No. FIRES-FR-198-08-AUNE of 29/10/2008
17. No. FIRES-FR-257-08-AUNS of 17/12/2008
18. No. FIRES-FR-256-08-AUNE of 19/12/2008
19. No. FIRES-FR-004-09-AUNE of 25/02/2009
20. No. FIRES-FR-057-09-AUNE of 09/06/2009
21. No. FIRES-FR-094-09-AUNE of 17/07/2009
22. No. FIRES-FR-201-09-AUNE of 20/01/2010
23. No. FIRES-FR-090-10-AUNE of 23/06/2010
24. No. FIRES-FR-121-10-AUNE of 30/07/2010
25. No. FIRES-FR-171-10-AUNE of 22/10/2010
26. No. FIRES-FR-044-11-AUNE of 20/05/2011
27. No. FIRES-FR-086-11-AUNE of 21/05/2011
28. No. FIRES-FR-126-11-AUNE of 27/06/2011
29. No. FIRES-FR-196-11-AUNE of 26/10/2011
30. No. FIRES-FR-266-11-AUNE of 23/02/2012
31. No. FIRES-FR-020-12-AUNE of 29/02/2012
32. No. FIRES-FR-102-12-AUNE of 18/05/2012
33. No. FIRES-FR-135-12-AUNE of 21/07/2012
34. No. FIRES-FR-217-12-AUNE of 27/09/2012
35. No. FIRES-FR-245-12-AUNE of 14/12/2012
36. No. FIRES-FR-005-13-AUNE of 24/01/2013
37. No. FIRES-FR-030-13-AUNE of 28/02/2013
38. No. FIRES-FR-060-13-AUNE of 19/04/2013
39. No. FIRES-FR-079-13-AUNE of 06/06/2013
40. No. FIRES-FR-108-13-AUNE of 12/07/2013
41. No. FIRES-FR-160-13-AUNE of 26/09/2013
42. No. FIRES-FR-183-13-AUNE of 25/10/2013
43. No. FIRES-FR-204-13-AUNE of 19/11/2013
44. No. FIRES-FR-224-13-AUNE of 02/12/2013
45. No. FIRES-FR-016-14-AUNE of 30/01/2014

46. No. FIRES-FR-049-14-AUNE of 04/04/2014
47. No. FIRES-FR-066-14-AUNE of 23/05/2014
48. No. FIRES-FR-098-14-AUNE of 27/05/2014
49. No. FIRES-FR-129-14-AUNE of 17/07/2014
50. No. FIRES-FR-143-14-AUNE of 22/08/2014
51. No. FIRES-FR-156-14-AUNE of 28/08/2014
52. No. FIRES-FR-174-14-AUNE of 21/11/2014
53. No. FIRES-FR-243-14-AUNE of 26/01/2015
54. No. FIRES-FR-225-14-AUNE of 22/12/2014
55. No. FIRES-FR-010-15-AUNE of 06/03/2015
56. No. FIRES-FR-015-15-AUNE of 09/03/2015
57. No. FIRES-FR-031-15-AUNE of 07/04/2015
58. No. FIRES-FR-035-15-AUNE of 10/04/2015
59. No. FIRES-FR-062-15-AUNE of 26/05/2015
60. No. FIRES-FR-112-15-AUNE of 01/07/2015
61. No. FIRES-FR-150-15-AUNE of 08/09/2015
62. No. FIRES-FR-202-15-AUNE of 12/01/2016
63. No. FIRES-FR-018-16-AUNE of 26/04/2016
64. No. FIRES-FR-029-16-AUNE of 29/04/2016
65. No. FIRES-FR-077-16-AUNE of 30/05/2016
66. No. FIRES-FR-135-16-AUNE of 16/08/2016
67. No. FIRES-FR-200-16-AUNE of 12/12/2016
68. No. FIRES-FR-239-16-AUNE of 09/12/2016
69. No. FIRES-FR-285-16-AUNE of 02/03/2017
70. No. FIRES-FR-015-17-AUNE of 29/03/2017
71. No. FIRES-FR-037-17-AUNE of 25/04/2017
72. No. FIRES-FR-100-17-AUNE of 02/06/2017
73. No. FIRES-FR-131-17-AUNE of 27/11/2017
74. No. FIRES-FR-153-17-AUNE of 31/08/2017
75. No. FIRES-FR-189-17-AUNE of 16/11/2017
76. No. FIRES-FR-206-17-AUNE of 14/12/2017
77. No. FIRES-FR-241-17-AUNE of 25/01/2018
78. No. FIRES-FR-224-17-AUNS3 of 30/01/2018
79. No. FIRES-FR-044-18-AUNS3 of 13/04/2018
80. No. FIRES-FR-062-18-AUNE3 of 06/04/2018
81. No. FIRES-FR-068-18-AUNE of 14/05/2018
82. No. FIRES-FR-114-18-AUNE2 of 13/07/2018
83. No. FIRES-FR-139-18-AUNE3 of 18/07/2018
84. No. FIRES-FR-175-18-AUNE2 of 07/09/2018
85. No. FIRES-FR-238-18-AUNE2 of 06/12/2018
86. No. FIRES-FR-244-18-AUNE2 of 10/12/2018
87. No. FIRES-FR-257-18-AUNE2 of 17/01/2019
88. No. FIRES-FR-029-19-AUNE2 of 25/02/2019
89. No. FIRES-FR-021-19-AUNE2 of 15/03/2019
90. No. FIRES-FR-059-19-AUNE2 of 09/04/2019
91. No. FIRES-FR-122-19-AUNE2 of 03/07/2019
92. No. FIRES-FR-136-19-AUNE3 of 26/07/2019
93. No. FIRES-FR-032-20-AUNE2 of 10/03/2020
94. No. FIRES-FR-164-20-AUNE2 of 05/11/2020
95. No. FIRES-FR-174-20-AUNE2 of 18/11/2020
96. No. FIRES-FR-247-20-AUNE2 of 08/03/2021
97. No. FIRES-FR-034-21-AUNE2 of 14/04/2021
98. No. FIRES-FR-067-21-AUNE2 of 28/04/2021
99. No. FIRES-FR-167-21-AUNE3 of 22/07/2021
100. No. FIRES-FR-189-21-AUNE2 of 21/09/2021
101. No. FIRES-FR-229-21-AUNE2 of 15/10/2021
102. No. FIRES-FR-318-21-AUNE2 of 14/01/2022
103. No. FIRES-FR-029-22-AUNE2 of 14/03/2022
104. No. FIRES-FR-103-22-AUNE2 of 27/05/2022

- 105. No. FIRES-FR-158-22-AUNE2 of 13/07/2022
 - 106. No. FIRES-FR-180-22-AUNE2 of 08/08/2022
 - 107. No. FIRES-FR-197-22-AUNE4 of 14/09/2022
 - 108. No. FIRES-FR-210-22-AUNE2 of 12/08/2022
- from Fires, s.r.o. Osloboditel'ov 282, 059 35 Batizovce, Slovakia.

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- 109. No. 31/13 of 28/07/2004
 - 110. No. 31/15 of 31/08/2005
 - 111. No. 31/20 of 21/04/2006
 - 112. No. 31/22 of 31/07/2006
 - 113. No. 31/24 of 30/11/2006
 - 114. No. 31/25 of 30/11/2006
 - 115. No. 31/27 of 30/11/2006
 - 116. No. 31/29 of 31/01/2007
 - 117. No. 31/30 of 31/01/2007
 - 118. No. 31/34 of 22/08/2007
 - 119. No. 31/43 of 30/10/2009
 - 120. No. 31/44 of 30/10/2009
 - 121. No. 31/45 of 30/04/2010
 - 122. No. 31/46 of 30/04/2010
 - 123. No. 31/47 of 30/04/2010
 - 124. No. 31/48 of 30/04/2010
 - 125. No. DMT-DO 31/49 of 30/06/2010
 - 126. No. DMT-DO 31/50 of 25/10/2010
 - 127. No. DMT-DO 31/51 of 09/12/2010
 - 128. No. DMT-DO 31/52 of 20/12/2010
 - 129. No. DMT-DO 31/55 of 31/01/2013
 - 130. No. DO 31-58 of 07/08/2013
 - 131. No. DO 31-53 of 19/12/2013
 - 132. No. DO 31-57 of 19/12/2013
 - 133. No. DO 31-60 of 15/01/2014
 - 134. No. DMT-31-59 of 25/04/2014
 - 135. No. DO 31-61 of 20/05/2014
 - 136. No. P-1015 DMT DO of 20/05/2014
 - 137. No. DO 31-70 of 04/08/2014
 - 138. No. P-1022 DMT DO of 16/05/2022
 - 139. No. P-1035 DMT DO of 28/12/2020
 - 140. No. DO 31-143 of 10/10/2019
 - 141. No. DO 31-161 of 25/01/2021
- from DMT GmbH - Fachstelle Für Brandschutz in Tremoniastrasse 13, 44137 Dortmund, Germany.

Test reports:

- 142. No. 232000094-1 of 03/09/2019
 - 143. No. 232000094-2 of 03/09/2019
 - 144. No. 232000185-01 of 04/11/2019
 - 145. No. 232000211-01 of 04/12/2019
 - 146. No. 232000289-1 of 05/01/2020
 - 147. No. 232000370-01 of 18/06/2020
 - 148. No. 232000373-01 of 31/07/2020
 - 149. No. 232000373 02 of 03/11/2020
 - 150. No. 232000373 03 of 08/06/2021
 - 151. No. 232000373 04 of 29/06/2021
 - 152. No. 232000589 01 of 20/05/2021
 - 153. No. 232000629-01 of 27/08/2021
- from MPA NRW, Auf den Thranen 2, 59597 Erwitte, Germany

Test reports:

- 154. No. MPA 2401/111/19 of 22/02/2020
 - 155. No. MPA 2401/335/20 of 16/07/2021
 - 156. No. MPA 2401/336/20 of 27/04/2021
 - 157. No. MPA 2401/406/21 of 26/08/2021
 - 158. No. MPA 2401/534/21 of 28/04/2022
 - 159. No. MPA 2401/486/21 of 30/08/2021
 - 160. No. MPA 2401/574/22 of 10/05/2022
 - 161. No. MPA 3200/090/14 of 15/12/2017
 - 162. No. MPA 3732/632/14 of 20/12/2017
 - 163. No. MPA 3593/674/14 of 18/07/2014
 - 164. No. MPA 2400/062/15 of 20/12/2017
 - 165. No. MPA 2401/117/16 of 15/02/2018
 - 166. No. MPA 2401/183/16 of 15/02/2018
- from MPA Braunschweig, Beethovenstrasse 52, D-38103 Braunschweig

Test reports:

- 167. No. RFTR19061 of 05/04/2019
 - 168. No. RFTR19062 of 05/04/2019
 - 169. No. RFTR19083 of 05/04/2019
 - 170. No. RFTR19084 of 05/04/2019
- from EFECTIS, Dilovasi OSB 5, Kisim Firat Cad. 1 18 41455

Test report:

- 171. No. LP-1369/06 of 18/12/2007
- from ITB Zakład Badań Ogniowych, ul. Ksawerów 21, 02-656 Warsaw.

Test reports (for fibre optics):

- 172. No. 12400010-2 of 05/03/2020 r. from Instytut Łączności-PIB, Laboratorium Badań Urządzeń Telekomunikacyjnych (LBUT), Zespół Badań Urządzeń Telewizyjnych, Kabli i Osprzętu (LB-4), ul. Szachowa 1, 04-894 Warsaw,
- 173. No. 901/BW/21 of 10/03/2021 from CNBOP-PIB ul. Nadwiślańska 213, 05-420 Józefów,
- 174. No. 1614/BW/21 of 10/01/2022 from CNBOP-PIB ul. Nadwiślańska 213, 05-420 Józefów,
- 175. No. FOC 2-09/2020 of 24/09/2020 from Technokabel S.A. ul. Nasielska 55, 04-343 Warsaw,

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- 176. No. FIRES-JR-119-17-NURE of 19/12/2017
- 177. No. FIRES-JR-145-17-NURE of 12/01/2018
- 178. No. FIRES-JR-161-17-NURE of 05/03/2018
- 179. No. FIRES-JR-148-17-NURE of 15/05/2018
- 180. No. FIRES-JR-068-18-NURE of 12/04/2018
- 181. No. FIRES-JR-074-18-NURE3 of 07/06/2018
- 182. No. FIRES-JR-088-18-NURE2 of 07/08/2018
- 183. No. FIRES-JR-098-18-NURE2 of 02/08/2018
- 184. No. FIRES-JR-025-18-NURE2 of 07/03/2018
- 185. No. FIRES-JR-028-18-NURE2 of 07/03/2018
- 186. No. FIRES-JR-034-18-NURE2 of 07/03/2018
- 187. No. FIRES-JR-031-18-NURE2 of 07/03/2018
- 188. No. FIRES-JR-037-18-NURE2 of 07/03/2018
- 189. No. FIRES-JR-040-18-NURE2 of 07/03/2018
- 190. No. FIRES-JR-043-18-NURE2 of 07/03/2018
- 191. No. FIRES-JR-046-18-NURE2 of 07/03/2018
- 192. No. FIRES-JR-049-18-NURE2 of 07/03/2018
- 193. No. FIRES-JR-052-18-NURE2 of 07/03/2018
- 194. No. FIRES-JR-055-18-NURE2 of 07/03/2018
- 195. No. FIRES-JR-058-18-NURE2 of 07/03/2018
- 196. No. FIRES-JR-119-18-NURE2 of 09/10/2018
- 197. No. FIRES-JR-142-18-NURE2 of 04/02/2019

198. No. FIRES-JR-153-18-NURE2 of 06/02/2019
 199. No. FIRES-JR-164-18-NURE2 of 07/02/2019
 200. No. FIRES-JR-038-19-NURE2 of 28/03/2019
 201. No. FIRES-JR-045-19-NURE3 of 08/04/2019
 202. No. FIRES-JR-052-19-NURE3 of 16/04/2019
 203. No. FIRES-JR-093-19-NURE2 of 16/07/2019
 204. No. FIRES-JR-107-19-NURE3 of 05/08/2019
 205. No. FIRES-JR-162-19-NURE2 of 02/10/2019
 206. No. FIRES-JR-165-19-NURE2 of 02/10/2019
 207. No. FIRES-JR-168-19-NURE2 of 02/10/2019
 208. No. FIRES-JR-171-19-NURE2 of 02/10/2019
 209. No. FIRES-JR-023-20-NURE of 15/06/2020
 210. No. FIRES-JR-063-20-NURE2 of 23/07/2020
 211. No. FIRES-JR-069-20-NURE2 of 03/08/2020
 212. No. FIRES-JR-082-20-NURE2 of 31/08/2020
 213. No. FIRES-JR-085-20-NURE2 of 31/08/2020
 214. No. FIRES-JR-088-20-NURE2 of 31/08/2020
 215. No. FIRES-JR-091-20-NURE2 of 31/08/2020
 216. No. FIRES-JR-094-20-NURE2 of 31/08/2020
 217. No. FIRES-JR-097-20-NURE2 of 31/08/2020
 218. No. FIRES-JR-098-20-NURE2 of 31/08/2020
 219. No. FIRES-JR-101-20-NURE2 of 31/08/2020
 220. No. FIRES-JR-104-20-NURE2 of 31/08/2020
 221. No. FIRES-JR-107-20-NURE2 of 31/08/2020
 222. No. FIRES-JR-110-20-NURE2 of 31/08/2020
 223. No. FIRES-JR-113-20-NURE2 of 31/08/2020
 224. No. FIRES-JR-116-20-NURE2 of 31/08/2020
 225. No. FIRES-JR-119-20-NURE2 of 31/08/2020
 226. No. FIRES-JR-122-20-NURE2 of 31/08/2020
 227. No. FIRES-JR-125-20-NURE2 of 31/08/2020
 228. No. FIRES-JR-147-20-NURE2 of 30/11/2020
 229. No. FIRES-JR-031-21-NURE of 04/03/2021
 230. No. FIRES-JR-096-21-NURE2 of 01/12/2021
 231. No. FIRES-JR-045-21-NURE of 04/03/2021
 232. No. FIRES-JR-048-21-NURE of 08/06/2021
 233. No. FIRES-JR-093-21-NURE of 30/11/2021
 234. No. FIRES-JR-096-21-NURE of 01/12/2021
 235. No. FIRES-JR-039-22-NURE of 08/03/2022
 236. No. FIRES-JR-092-22-NURE of 14/06/2022
 237. No. FIRES-JR-095-22-NURE of 14/06/2022
 238. No. FIRES-JR-123-22-NURE of 27/09/2022
 239. No. FIRES-JR-126-22-NURE2 of 30/09/2022
 240. No. FIRES-JR-138-22-NURE4 of 25/10/2022
 241. No. FIRES-JR-129-22-NURE2 of 26/10/2022
- from Fires, s.r.o. Osloboditel'ov 282, 059 35 Batizovce, Slovakia.

Expert opinion

242. No. 2400/738/18-4 of 11/07/2022
243. No. 2400/792/18 of 25/10/2018
issued by MPA Braunschweig, Beethovenstrasse 52, D-38103 Braunschweig
244. Hu-001-23 of 10/01/2023
issued by Fires, s.r.o. Osloboditel'ov 282, 059 35 Batizovce, Slovakia.

Documentation

No.	Document name	Document no.	Date
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1.	Application for issuing a National Technical Assessment together with annexes	0083/DOT/KOT/2022	07/11/2022
2.	Application for issuing a National Technical Assessment together with annexes	0019/DOT/KOT/2023	31/01/2023

ANNEXES

Annex 1 Standard support structures

Annex 2 Special support structures

Annex 3 Special support structures - 120 min, fibre optic cables

Annex 4 Connection of cable trays and racks, channels and wire mesh trays

Annex 1

Standard support structures

KCP/KCOP...H60 (KCP...H60)

Cable tray

- sheet thickness 1.5 mm
- max. width 300 mm
- horizontal mounting
- load capacity 10 kg/m

A1



DGOP...H60

Cable rack

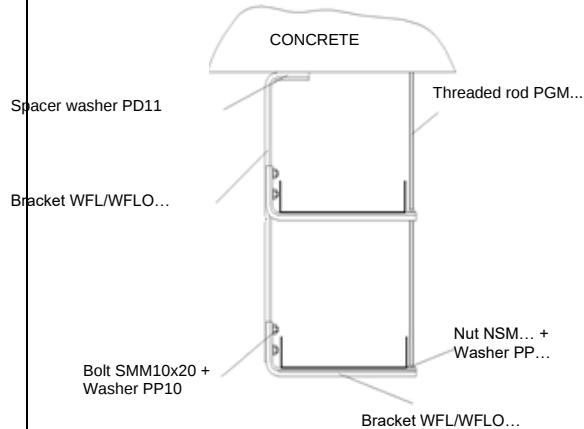
- sheet thickness 1.5 mm
- max. width 400 mm
- vertical and horizontal mounting
- load capacity 20 kg/m

A2



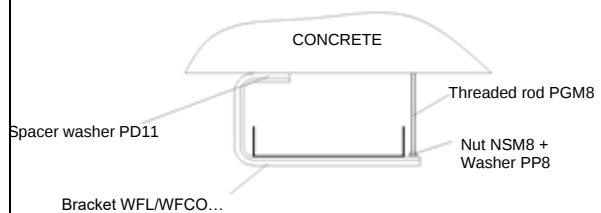
Support spacing max. 1.2 m
Ceiling structures

1



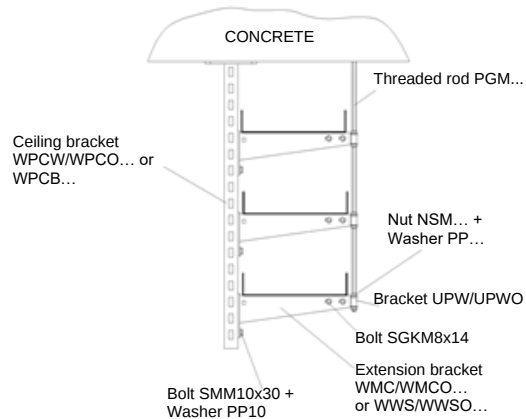
- maximum two route levels
- maximum load capacity of the structure 48 kg
- max. load per extension bracket 24 kg
- maximum extension bracket length 400 mm.

2



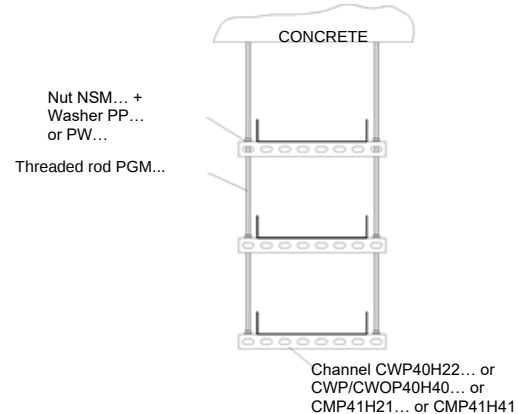
- maximum one route level
- maximum load capacity of the structure 24 kg
- maximum length of bracket/extension bracket 400 mm

3



- maximum three route levels
- maximum load capacity of the structure 72 kg
- max. load per extension bracket 24 kg
- maximum extension bracket length 400 mm

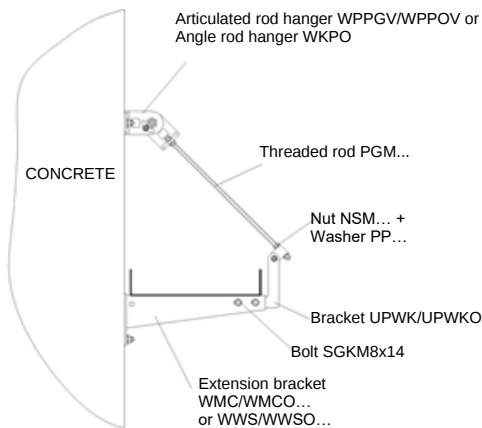
4



- maximum three route levels
- maximum load capacity of the structure 72 kg
- maximum load capacity per level 24 kg
- maximum channel length 500 mm

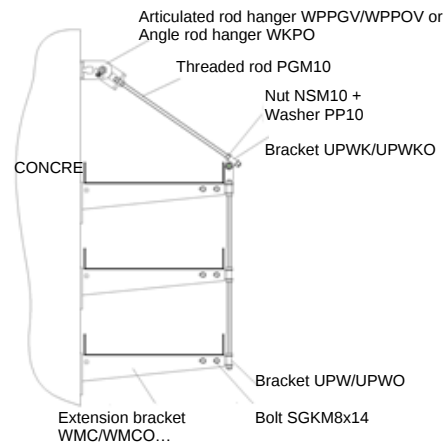
Support spacing max. 1.2 m Wall structures

5



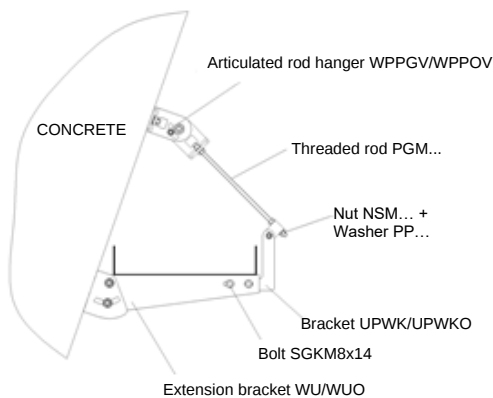
- maximum load capacity of the structure 24 kg
- maximum extension bracket length 400 mm

6



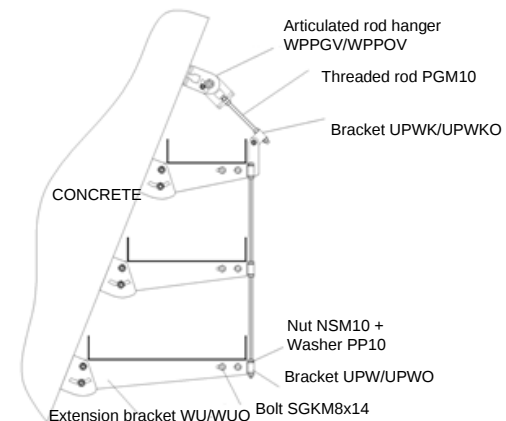
- maximum three route levels
- maximum load capacity of the structure 72 kg
- max. load per extension bracket 24 kg
- maximum extension bracket length 400 mm

7



- maximum load capacity of the structure 24 kg
- maximum extension bracket length 400 mm

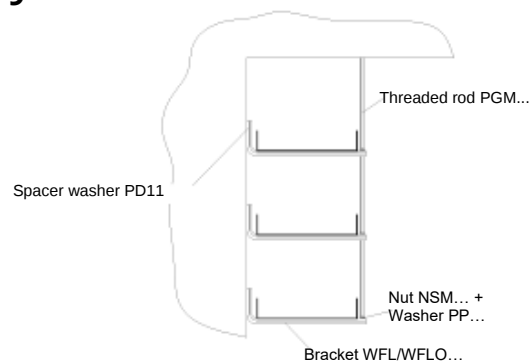
8



- maximum three route levels
- maximum load capacity of the structure 72 kg
- max. load per extension bracket 24 kg
- maximum extension bracket length 400 mm

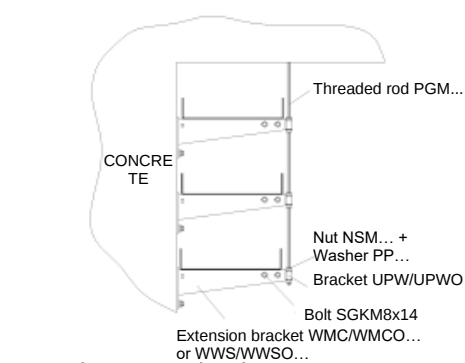
Support spacing max. 1.2 m Wall and ceiling structures

9



- maximum three route levels
- maximum load capacity of the structure 60 kg
- maximum load per bracket/extension bracket 24 kg
- maximum length of bracket/extension bracket 400 mm

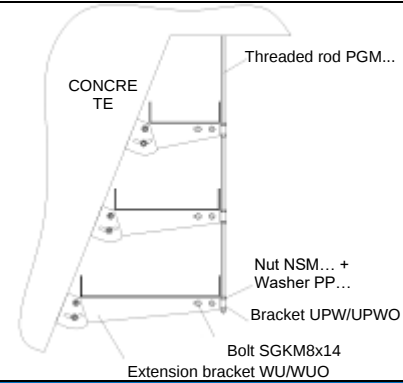
10



- maximum three route levels
- maximum load capacity of the structure 72 kg
- maximum load per bracket/extension bracket 24 kg
- maximum length of bracket/extension bracket 400 mm

11

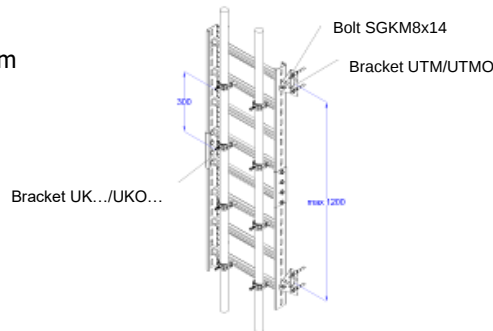
- maximum three route levels
- maximum load capacity of the structure 72 kg
- maximum load per bracket/extension bracket 24 kg
- maximum length of bracket/extension bracket 400 mm



Support spacing max. 1.2 m Vertical structures

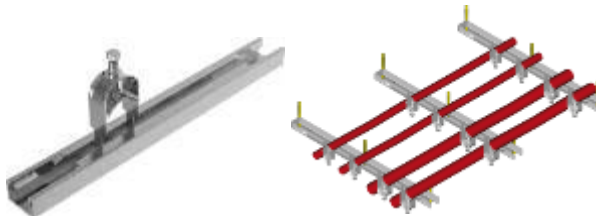
12

- applies only to cable racks
- attach cables max every 300 mm

**SD/SDO... (SD) + UK/UKO... (UK)**

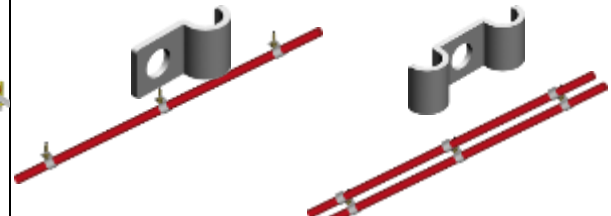
Rung + bracket

- rung spacing max. 300 mm
- cable/conductor routing vertical and horizontal
- cable/conductor routing on walls and ceilings

**B1****UDF..., UEF...**

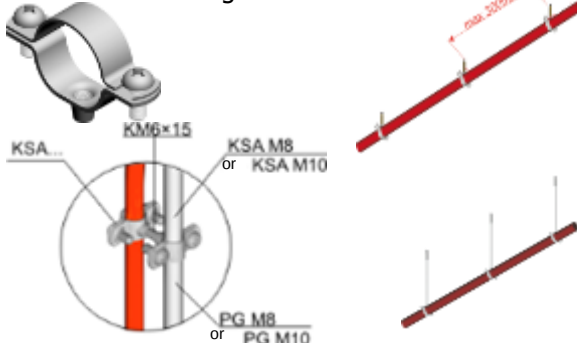
Cable clip

- bracket spacing max. 300 mm
- cable/conductor routing vertical and horizontal
- cable/conductor routing on walls and ceilings

**B2****KSA...**

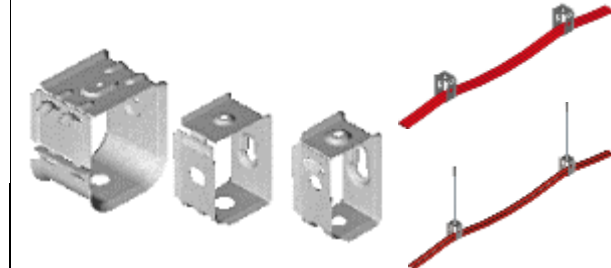
Cable clamp

- clamps spacing max. 300 mm
- cable/conductor routing vertical and horizontal
- cable/conductor routing on walls and ceilings

**B3****OZ/OZO(OZ), OZS/OZSO(OZS), OZM/OZMO(OZM)**

Cable clamp

- clamps spacing max. 300 mm
- cable/conductor routing, horizontal
- cable/conductor routing on walls and ceilings

**B4**

CLASSIFICATION OF CABLE ASSEMBLIES ON STANDARD CABLE SUPPORTING STRUCTURES

Annex 1 Table 1. **Group A1, A2, B1, B2, B3, B4** cable classification- Standard support structures.

	Cable type	A1	A2	B1	B2	B3	B4
BITNER	NHXXH E90 = NHXXH-J E90	E90	E90	E90	E90	E90	E90
	(N)HXXH E90 = (N)HXXH-J E90	E90	E90	E60	E90	E90	
	NHXXCH E90	E90	E90	E90	E90	E90	E90
	(N)HXXCH E90	E90	E90	E60	E90		
	BiTflame S-M(St) E90					E90	
	BiTflame AS E90					E30	
	HDGs E90	E90	E90	E90	E90		E90
	HDGsekwf E90	E90	E30	E90	E90		E30
	HTKSH E90	E90	E90	E90	E90		E90
	HTKSHekw E90	E90	E90	E90	E90		E90
	PGI-H E90	E90	E60		E90		
DÄTWYLER	Cable type	A1	A2	B1	B2	B3	B4
	(N)HXXH	E90	E90	E60	E60	E30	E90
	(N)HXXCH	E90		E60		E90	E90
	JE-H(St)H	E90	E60	E30		E30	
	JE-H(St)HRH	E30	E90				
ELKOND	Cable type	A1	A2	B1	B2	B3	B4
	NHXXH = NHXXH-J	E90	E90	E90	E90		
	N2XH P30	E90	E90		E60		
	N2XH P60	E90	E90	E60			
	JE-H(st)H	E90	E90	E30	E90		
	1-CXXKH-V	E90	E90		E90		E90
	SSKFH-V180 P60	E90	E90	E60	E30		
	SHKFH-V180 P90	E90	E90	E90	E90		
	SHXXFH-V180	E90	E90		E90		E90
ELPAR	Cable type	A1	A2	B1	B2	B3	B4
	NHXXH = NHXXH-J	E90	E30	E90	E90		
	(N)HXXH = (N)HXXH-J	E90	E90	E90	E90		
	NHXXCH	E90	E90	E90	E90		
	(N)HXXCH	E60	E90	E90	E90		
	HDGs	E90	E90	E90	E90		
	HTKSH	E90	E30	E90	E90		
EUPEN	Cable type	A1	A2	B1	B2	B3	B4
	(N)HXXH = (N)HXXH-J	E90	E90	E90		E90	
	(N)HXXH = (N)HXXH-J	E90	E90	E90		E90	
	JE-H(st)H	E90	E90	E90		E90	
E R	Cable type	A1	A2	B1	B2	B3	B4

	(N)HXH = (N)HXH-J		E90				
	(N)HXH = (N)HXH-J		E90				
	JE-H(st)H		E90				
KABLOTEK	Cable type	A1	A2	B1	B2	B3	B4
	NHXH = NHXH-J	E90	E90	E90		E90	
	NHXCH	E90	E90	E90		E90	
	JE-H(St)H	E90	E90	E90		E90	
	LINCH		E90				
MADEX	Cable type	A1	A2	B1	B2	B3	B4
	NHXH - NHXH-J	E90	E60	E60	E90	E60	
	NHXCH	E90	E90	E90	E90	E90	
	HTKSH	E90	E90	E90	E90	E90	
	HTKSHekw	E30	E90	E60	E90	E90	
NKT	Cable type	A1	A2	B1	B2	B3	B4
	NHXH = NHXH-J	E90	E90	E90	E90	E90	E90
PRAKAB	Cable type	A1	A2	B1	B2	B3	B4
	PRAFlaDur 1-CCXKH-V180	E90	E90	E90	E90	E90	E90
	NHXH = NHXH-J				E90		
STUDER	Cable type	A1	A2	B1	B2	B3	B4
	(N)HXH = (N)HXH-J	E90	E90	E90	E90		
	(N)HXCH	E90	E90	E90	E90		E90
	(N)HXCH E30	E30					E60
	JE-H(St)H	E90	E60	E90	E90		E90
	JE-H(St)HRH	E90	E30	E90	E90		E90
TECHNOKABEL	Cable type	A1	A2	B1	B2	B3	B4
	NHXH E90 = NHXH-J E90	E90	E90	E90	E90	E90	E90
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90
	NHXCH E90	E90	E90	E90			E90
	(N)HXCH E90	E90	E90	E90			
	(N)HXCH-J SERVO E90	E90			E90	E90	E90
	NHXHRHX E90 = NHXHRHX-J E90				E90		
	JE-H(St)H E30 - E90	E90	E90	E90	E90		E90
	HDGs E30-E90	E90	E90		E90		E90
	HDGszo E30-E90	E90	E90	E90	E90		
	HDGszo-W E30-E90	E90			E90		E90
	HDGsekw E30-E90		E30				
	HDGsekwzo E30-E90	E30		E90	E90		
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90	E90	E90	E90	E90	E90
	HLGs E30-E90	E90	E90	E90	E90		
	HLGszo E30-E90	E90	E30				
	HLGsekw E30-E90	E30	E30	E90			E90
┌ ┐	Cable type	A1	A2	B1	B2	B3	B4

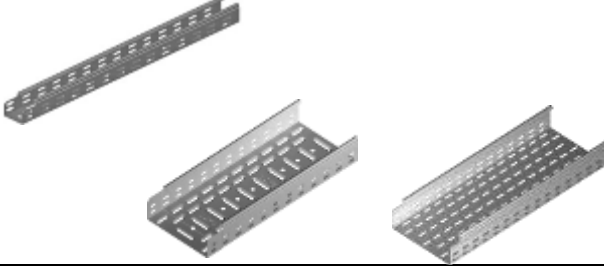
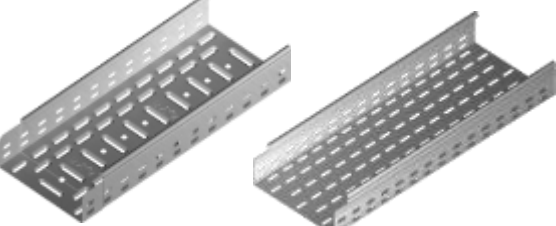
	FLAME-X 950 NHXH E90= NHXH-J E90	E90	E90	E90	E90		
	FLAME-X 950 NHXCH E90	E90	E90	E90	E90		
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E60	E90		E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E90	E60		E90	E90	E90
	N2XH	E90	E90				
	JE-H(St)H	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HDGs E30-E90	E90	E90		E90	E90	
	FLAME-X 950 HTKSH E90	E90	E90		E90		E60
	HLGsekw						E30
VLG	Cable type	A1	A2	B1	B2	B3	B4
	(N)HXH E90	E90	E90	E90	E90	E90	
	(N)HXH E30	E90	E60	E90	E60	E90	
	JE-H(St)H E90	E90	E60	E90	E90	E90	
	JE-H(St)H E30	E90	E60	E90	E90	E90	

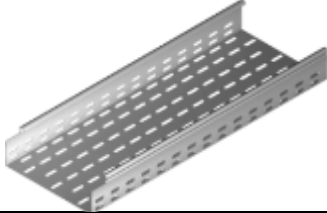
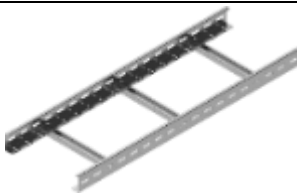
On the basis of DIN 4102-12:1998, it is possible to transfer the results of the maintenance tests for electric cables or conductors laid on standard support structures in accordance with DIN 4102- 12:1998 to standard cable support structures of other manufacturers.

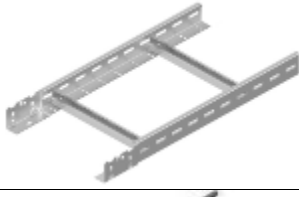
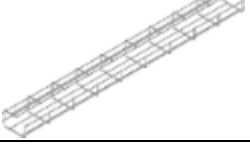
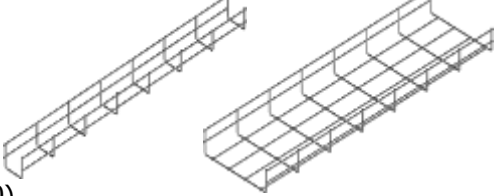
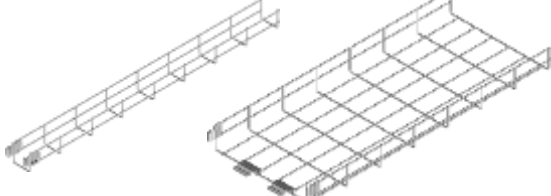
The classifications of the cable systems according to DIN 4102- 12:1998, depending on the standard cable supporting structure and the cable used, are described in the CNBOP-PIB National Technical Assessments for the cable systems.

Annex 2

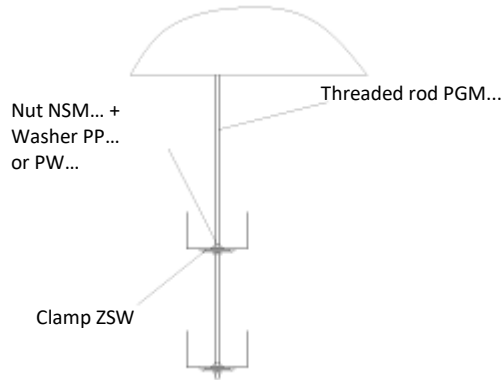
Special support structures

KGL/KGOL...H60(KGL...H60) KCL/KCOL...H60(KCL...H60) KGL/KCL50H60 Cable tray - sheet thickness 0.7 mm - width 50 - 300 mm - horizontal mounting - load capacity 20 kg/m (5 kg for KGL/KCL50H60)		K1
KGL100H42 KCL100H42 Cable tray - sheet thickness 0.7 mm - width 100 mm - horizontal mounting - load capacity 2 kg/m		K2
CWP/CWOP40H40 Perforated section - channel sheet thickness 1.5 mm - horizontal mounting - load capacity 5 kg/m		K3
KFL...H60 Cable tray - sheet thickness 0.7 mm - width 50 - 300 mm - horizontal mounting - load capacity 20 kg/m (5 kg for KFL50H60)		K4
KLFL75H60 Cable tray - sheet thickness 0.7 mm - width 75 mm - horizontal mounting - load capacity 2 kg/m		K5
KBL...H60 Cable tray - sheet thickness 0.7 mm - width 50 - 300 mm - horizontal mounting - load capacity 20 kg/m (5 kg/m for KBL50H60)		K6
KGJ/KGOJ...H60(KGJ...H60) KCJ/KCOJ...H60(KCJ...H60) Cable tray - sheet thickness 1 mm - width 100 - 400 mm - horizontal mounting - load capacity 20 kg/m		K7

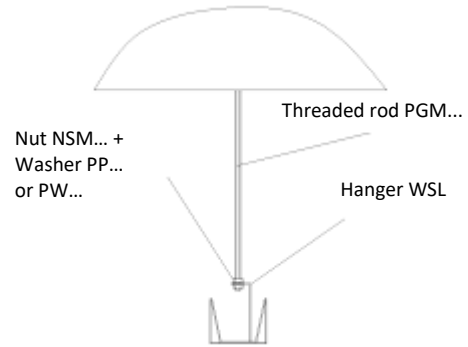
KFJ...H60 Cable tray - sheet thickness 1 mm - width 100 - 400 mm - horizontal mounting - load capacity 20 kg/m		K8
KBJ...H60 Cable tray - sheet thickness 1 mm - width 100 - 400 mm - horizontal mounting - load capacity 20 kg/m		K9
KCD/KCOD...H60(KCD...H60) Cable tray - sheet thickness 1.2 mm - width 100 - 400 mm - horizontal mounting - load capacity 10 kg/m		K10
KCP/KCOP...H60(KCP...H60) Cable tray - sheet thickness 1.5 mm - width 100 - 600 mm - horizontal mounting - load capacity 25 kg/m		K11
DUJ...H60 Cable rack - sheet thickness 1.0 mm - width 100 - 400 mm - horizontal mounting - load capacity 10 kg/m		D1
DUD...H60 Cable rack - sheet thickness 1.2 mm - width 100 - 600 mm - vertical and horizontal mounting - load capacity 25 kg/m		D2
DUD...H45 Cable rack - sheet thickness 1.2 mm - width 100 - 400 mm - horizontal mounting - load capacity 10 kg/m		D3
DGOD Cable rack - sheet thickness 1.2 mm - width 100 - 400 mm - vertical and horizontal mounting - load capacity 20 kg/m		D4
DUP/DUOP...H60(DUP...H60) Cable rack - sheet thickness 1.5 mm - width 100 - 600 mm - vertical and horizontal mounting - load capacity 30 kg/m (40 kg/m for structure 64)		D5

DGOP Cable rack - sheet thickness 1.5 mm - width 100 - 600 mm - vertical and horizontal mounting - load capacity 20 kg/m		D6
DFP Cable rack - sheet thickness 1.5 mm - width 100 - 400 mm - horizontal mounting - load capacity 20 kg/m		D7
DUVC...H60 Cable rack - sheet thickness 2.0 mm - width 100 - 600 mm - vertical mounting - load capacity 20 kg/m		D8
KGS...H60 Mesh tray - horizontal mounting - load capacity 5 kg/m - width 60-100 mm		S1
KDS/KDSO...H60(KDS...H60) KSG...H60 Mesh tray - width 60 - 600 mm - vertical and horizontal mounting - load capacity 20 kg/m (2 kg/m for KDS/KDSO60H60 and KSG60H60)		S2
KDSZ...H60 Mesh tray - width 60-400 mm - horizontal mounting - load capacity 20 kg/m (2 kg/m for KDSZ60H60)		S3

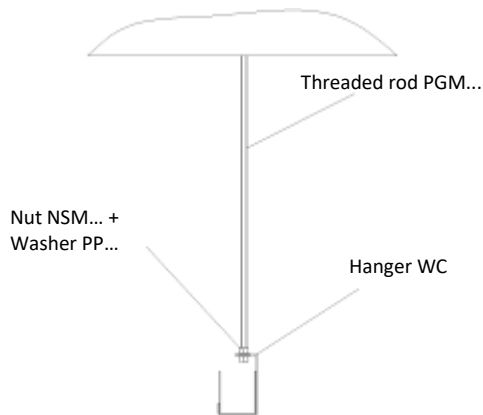
Ceiling structures

1

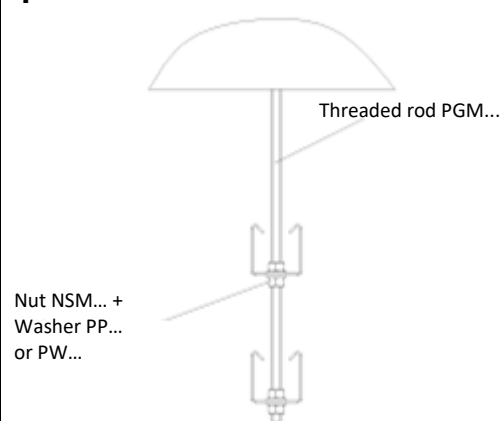
- maximum two route levels
- maximum load capacity of the structure 15 kg
- maximum load capacity per level 15 kg
- maximum tray width 100 mm
- maximum support spacing 1.5 m

2

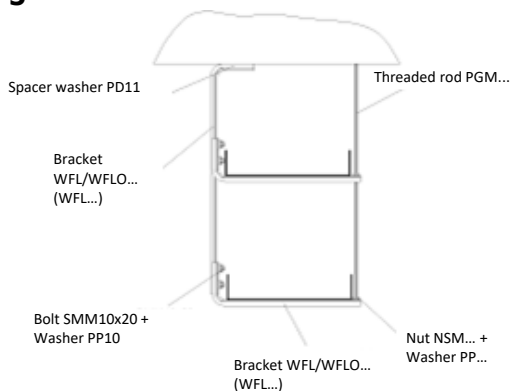
- maximum load capacity of the structure 3 kg
- maximum support spacing 1.5 m

3

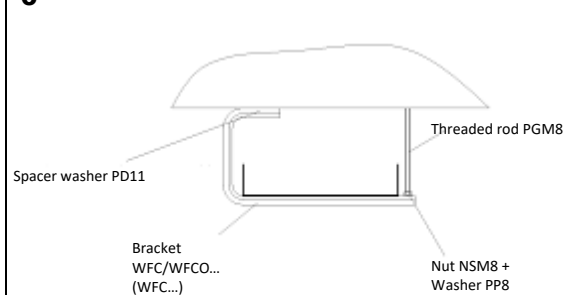
- maximum load capacity of the structure 7.5 kg
- maximum support spacing 1.5 m
- the WC hanger can be attached directly to the ceiling
- for tray width of 50 mm

4

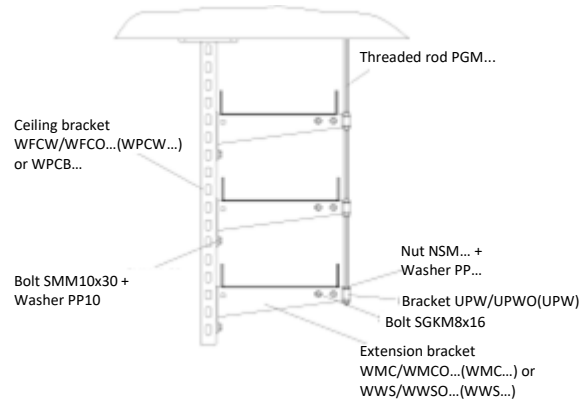
- maximum two route levels
- maximum load capacity of the structure 15 kg
- maximum load capacity per level 7.5 kg
- maximum support spacing 1.5 m
- possibility to fix fire safety system devices (up to 3,5 kg) to the channel base

5

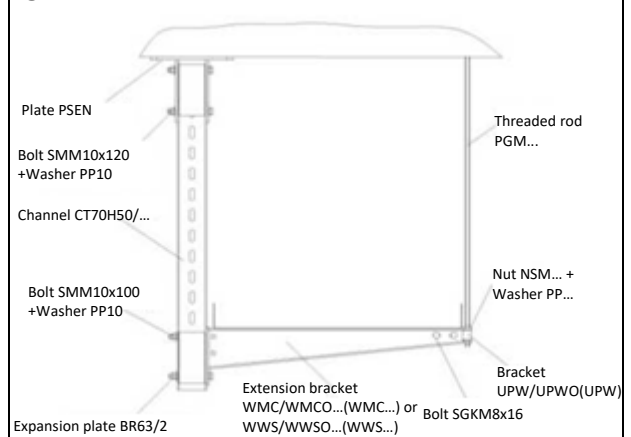
- maximum two route levels
- maximum load capacity of the structure 60 kg
- maximum extension bracket load capacity 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

6

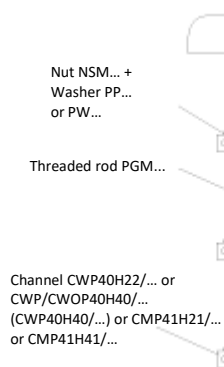
- maximum one route level
- maximum load capacity of the structure 30 kg
- maximum length of bracket/extension bracket 400 mm
- maximum support spacing 1.5 m

7

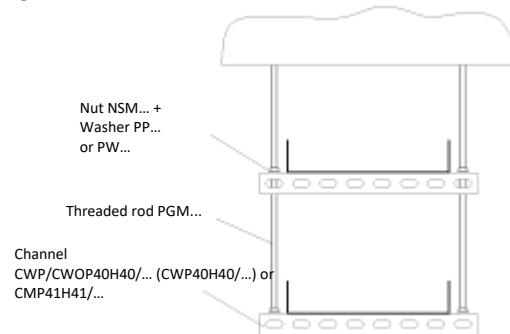
- maximum three route levels
- maximum load capacity of the structure 97.5 kg
- maximum extension bracket load capacity 37,5 kg
- maximum extension bracket length 400 mm
- it is possible to run routes on both sides of the support
- maximum support spacing 1.5 m

8

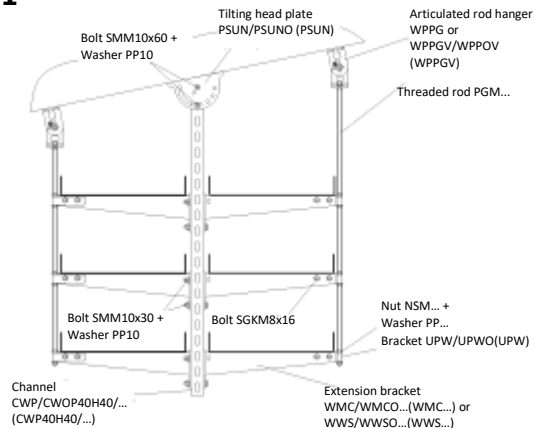
- maximum one route level
- maximum load capacity of the structure 37.5 kg
- maximum extension bracket length 600 mm
- maximum support spacing 1.5 m

9

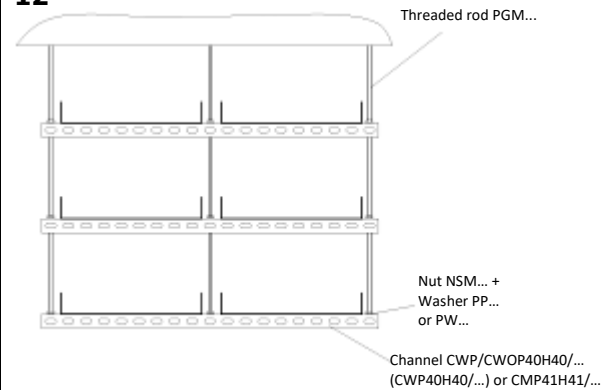
- maximum three route levels
- maximum load capacity of the structure 100 kg
- maximum load per channel 45 kg
- maximum channel length 700 mm
- maximum support spacing 1.5 m

10

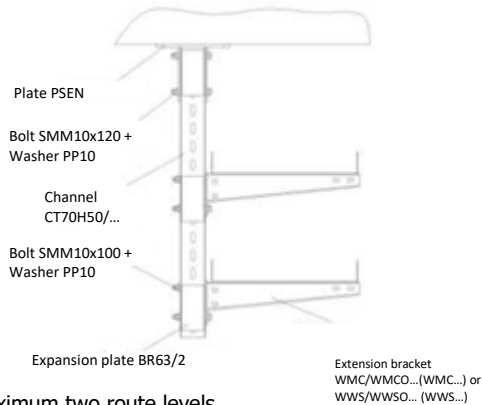
- maximum two route levels
- maximum load capacity of the structure 68 kg
- maximum load per channel 34 kg
- maximum channel length 500 mm
- maximum support spacing 1.7 m

11

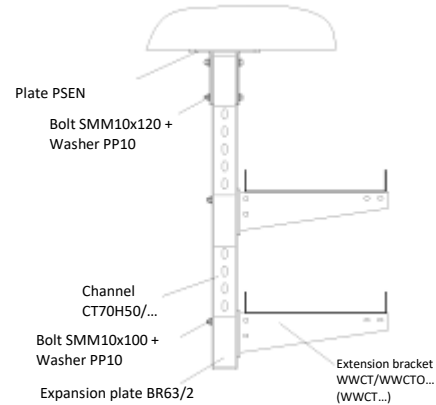
- maximum three route levels
- maximum load capacity of the structure 150 kg
- max. load per extension bracket 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

12

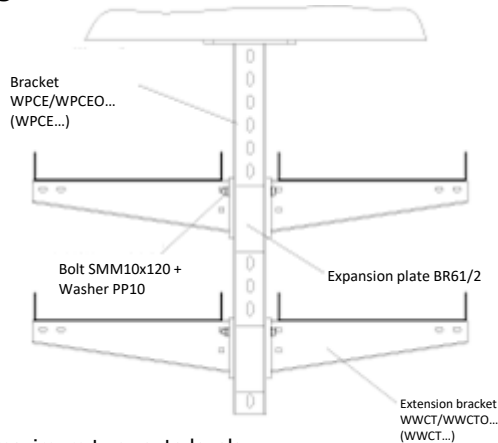
- maximum three route levels
- maximum load capacity of the structure 150 kg
- maximum load per route 30 kg
- maximum PGM rods spacing 650 mm
- maximum support spacing 1.5 m

13

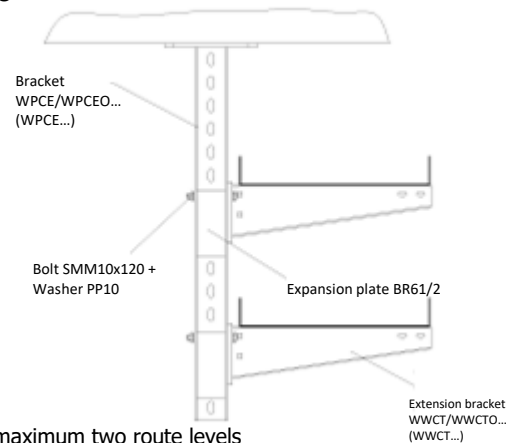
- maximum two route levels
- maximum load capacity of the structure 60 kg
- max. load per extension bracket 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

14

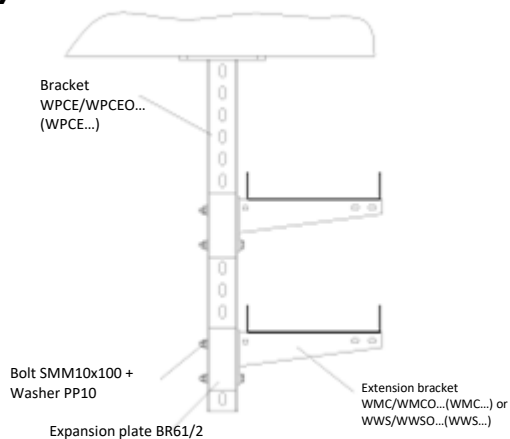
- maximum two route levels
- maximum load capacity of the structure 45 kg
- max. load per extension bracket 22.5 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

15

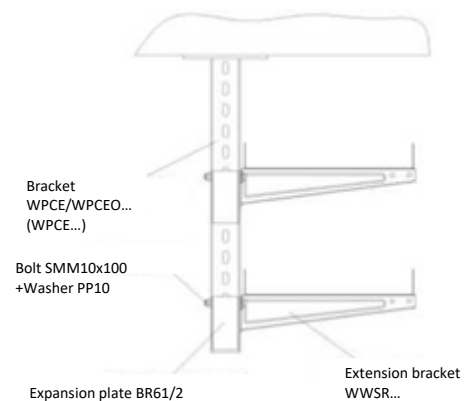
- maximum two route levels
- maximum load capacity of the structure 120 kg
- max. load per extension bracket 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

16

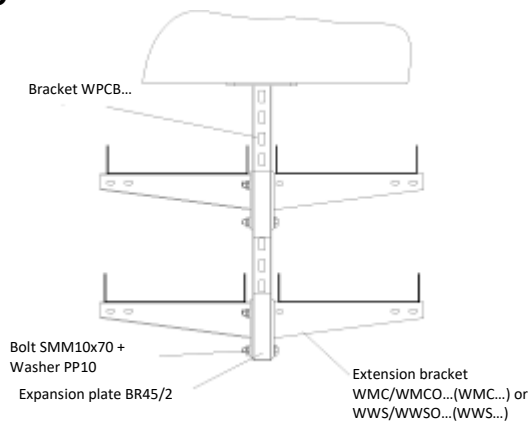
- maximum two route levels
- maximum load capacity of the structure 60 kg
- max. load per extension bracket 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

17

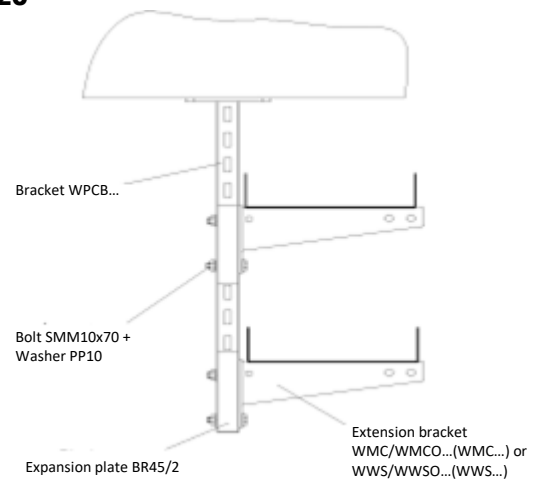
- maximum two route levels
- maximum load capacity of the structure 60 kg
- maximum load per extension bracket 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

18

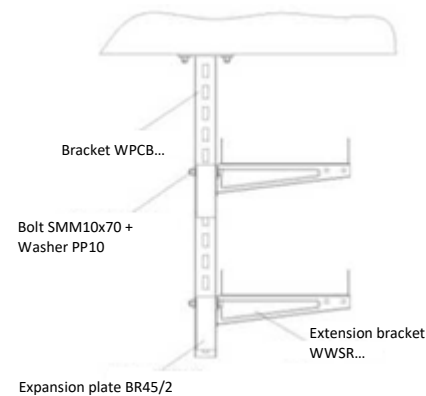
- maximum two route levels
- maximum load capacity of the structure 60 kg
- maximum extension bracket load capacity 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

19

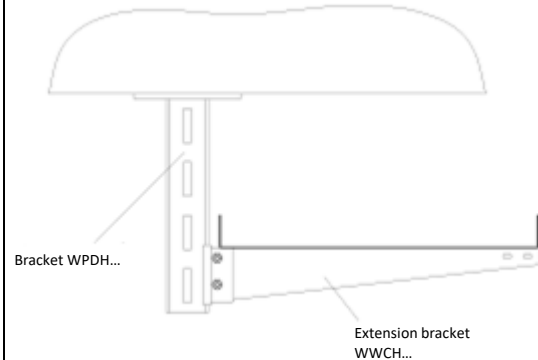
- maximum two route levels
- maximum load capacity of the structure 60 kg
- max. load per extension bracket 15 kg
- maximum extension bracket length 300 mm
- maximum support spacing 1.5 m

20

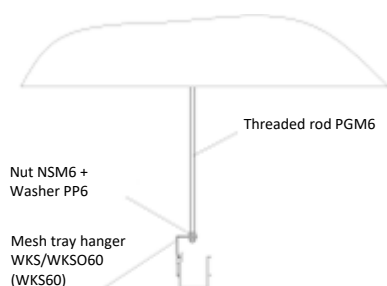
- maximum two route levels
- maximum load capacity of the structure 30 kg
- max. load per extension bracket 15 kg
- maximum extension bracket length 300 mm
- maximum support spacing 1.5 m

21

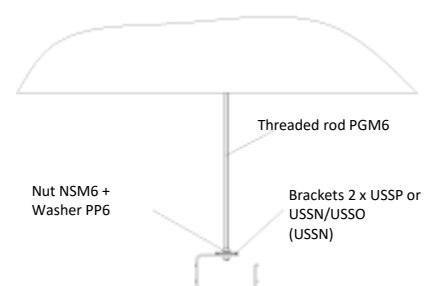
- maximum one route level
- maximum load capacity of the structure 30 kg
- maximum extension bracket load capacity 15 kg
- maximum extension bracket length 300 mm
- maximum support spacing 1.5 m

22

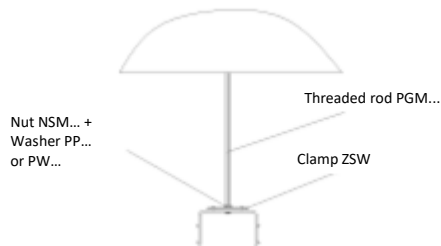
- maximum one route level
- max. load of the structure / extension bracket 30 kg
- maximum extension bracket length 600 mm
- maximum support spacing 1.5 m

23

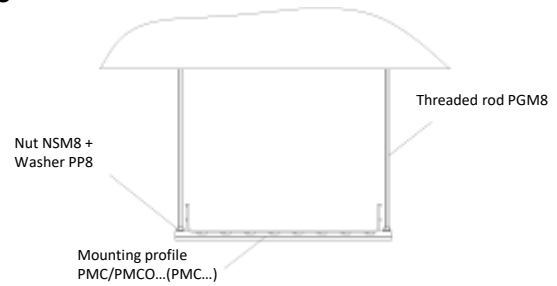
- maximum load capacity of the structure 2.25 kg
- fixing the hanger directly to the ceiling is permitted
- maximum support spacing 1.5 m

24

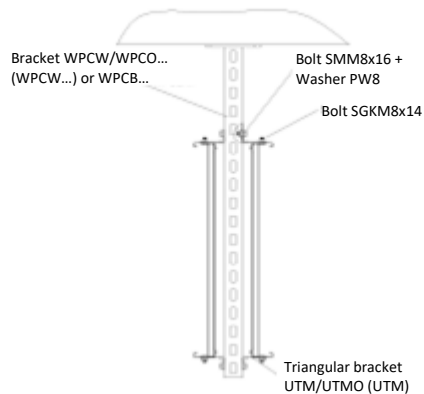
- maximum load capacity of the structure 7.5 kg
- fixing the bracket directly to the ceiling is permitted
- maximum support spacing 1.5 m

25

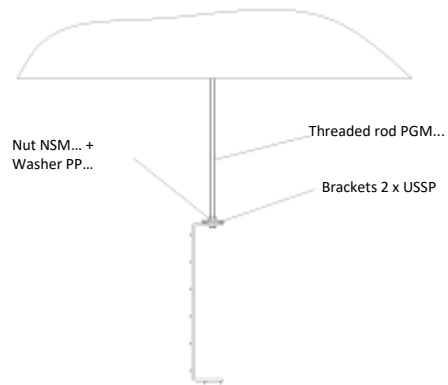
- maximum load capacity of the structure 3.6 kg
- for tray widths of 100 mm
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- maximum support spacing 1.2 m

26

- maximum one route level
- maximum load capacity of the structure 22.5 kg
- maximum length of PMC/PMCO (PMC) profile - 400 mm
- maximum support spacing 1.5 m
- minimum tray width 100 mm

27

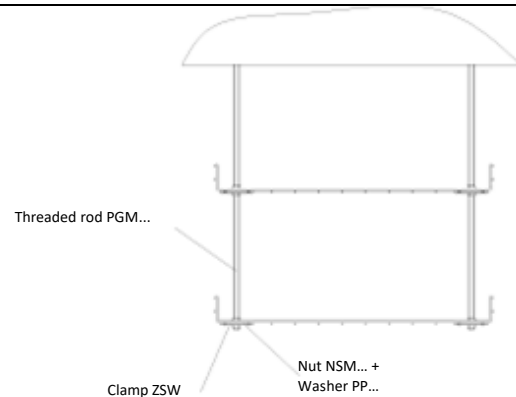
- maximum load capacity of the structure 60 kg
- maximum load capacity per rack 30 kg
- single-sided construction (with one rack) possible
- the cables should be fixed with UK1/UKO1 (UK1) brackets max every 600 mm
- maximum rack width 600 mm
- maximum support spacing 1.5 m

28

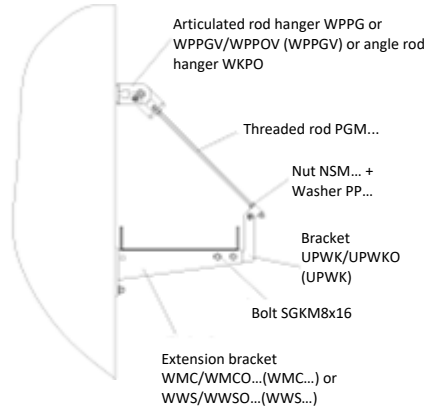
- maximum load capacity of the structure 12 kg
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 – 400 mm
- maximum support spacing 1.2 m

29

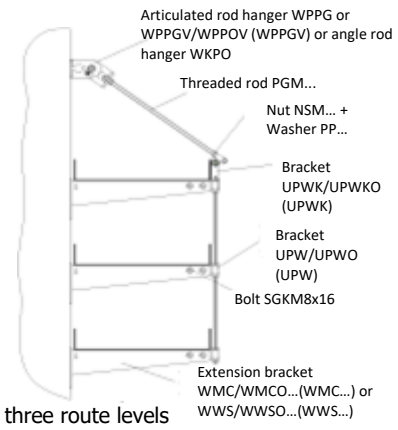
- maximum two route levels
- maximum load capacity of the structure 48 kg
- for tray widths of 100 – 600 mm
- maximum support spacing 1.5 m



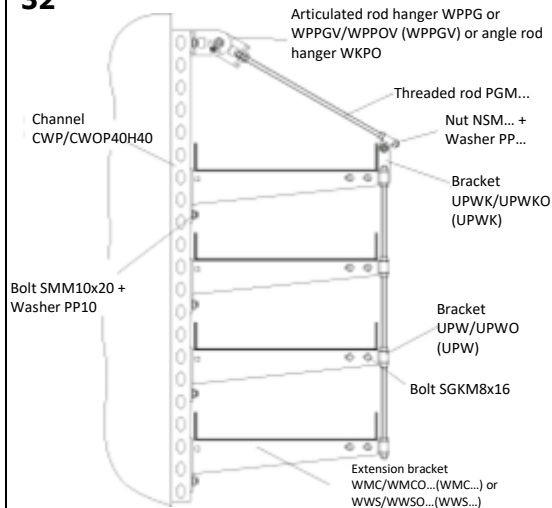
Wall structures

30

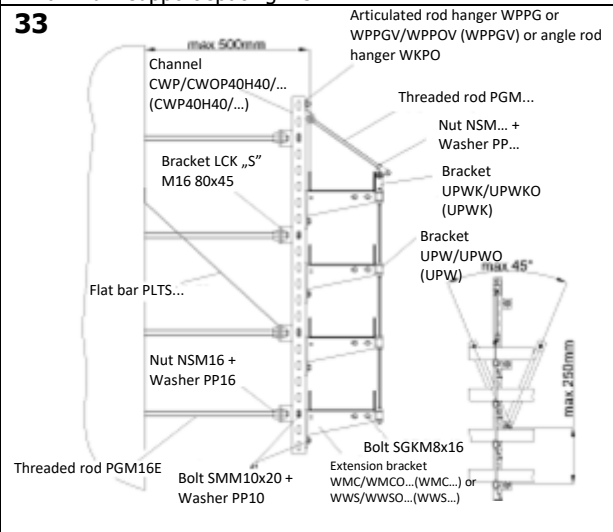
- maximum extension bracket load capacity 30 kg
- maximum extension bracket length 600 mm (400 mm for WMC/WMCO (WMC))
- maximum support spacing 1.5 m

31

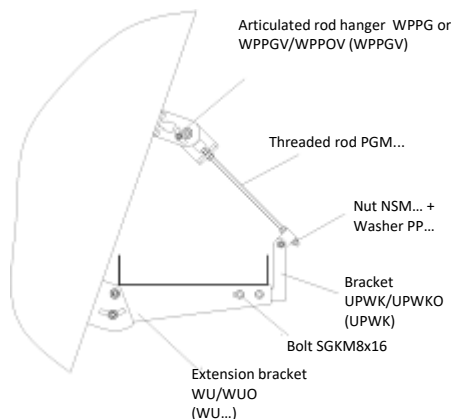
- maximum three route levels
- maximum extension bracket load capacity 30 kg
- maximum load capacity of the structure 90 kg
- maximum extension bracket length 600 mm (400 mm for WMC/WMCO (WMC))
- maximum support spacing 1.5 m

32

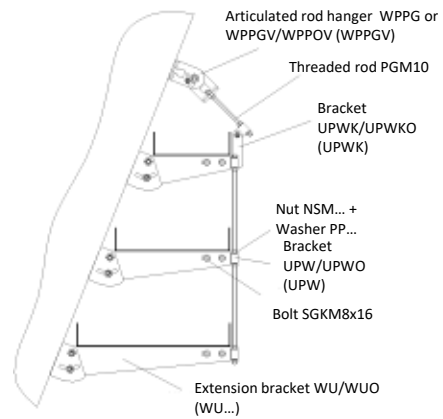
- maximum four route levels
- maximum extension bracket load capacity 30 kg
- maximum load capacity of the structure 120 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

33

- maximum four route levels
- maximum extension bracket load capacity 24 kg
- maximum load capacity of the structure 96 kg
- maximum extension bracket length 200 mm
- maximum support spacing 1.2 m

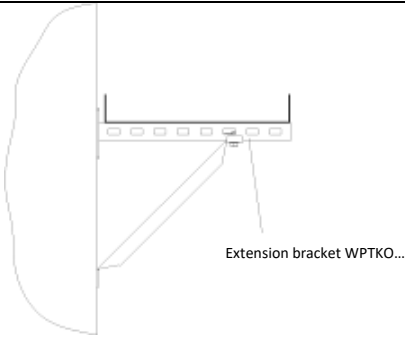
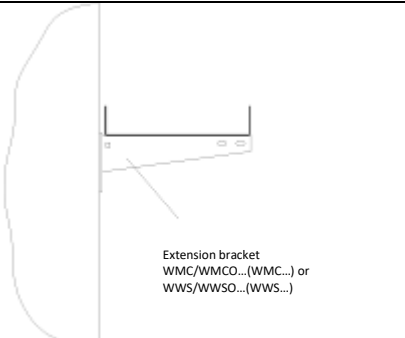
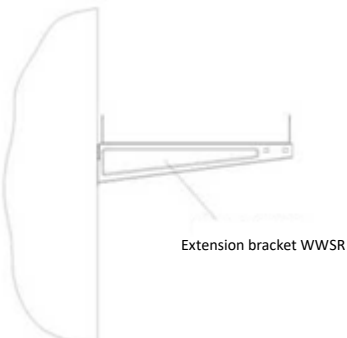
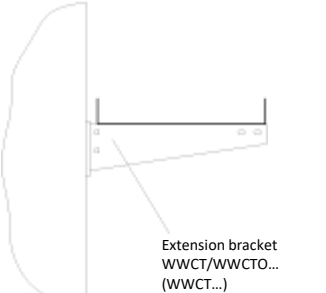
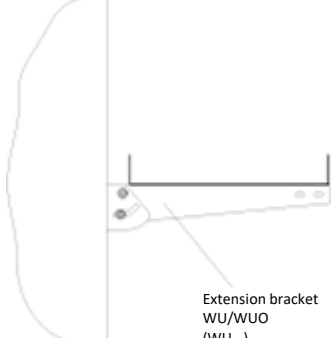
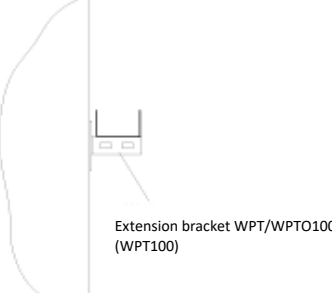
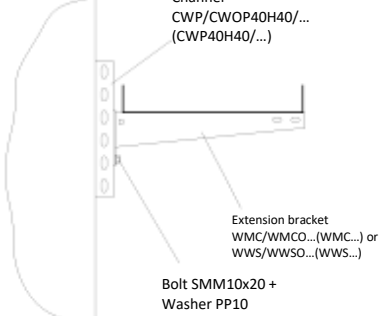
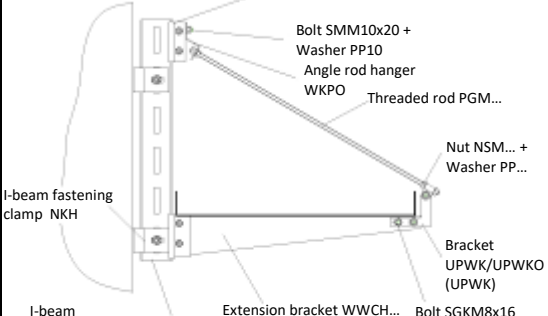
34

- maximum extension bracket load capacity 30 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

35

- maximum three route levels
- maximum extension bracket load capacity 30 kg
- maximum load capacity of the structure 90 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

36**37**

 Extension bracket WPTKO... - maximum extension bracket load capacity 30 kg - maximum extension bracket length 400 mm - maximum support spacing 1.5 m	 Extension bracket WMC/WMCO...(WMC...) or WWS/WWSO...(WWS...) - maximum extension bracket load capacity 30 kg - maximum extension bracket length 400 mm - maximum support spacing 1.5 m
38  Extension bracket WWSR - maximum extension bracket load capacity 30 kg - maximum extension bracket length 300 mm - maximum support spacing 1.5 m	39  Extension bracket WWCT/WWCTO...(WWCT...) - maximum extension bracket load capacity 30 kg - maximum extension bracket length 600 mm - maximum support spacing 1.5 m
40  Extension bracket WU/WUO (WU...) - maximum extension bracket load capacity 15 kg - maximum extension bracket length 300 mm - maximum support spacing 1.5 m	41  Extension bracket WPT/WPTO100 (WPT100) - maximum extension bracket load capacity 15 kg - maximum extension bracket length 100 mm - maximum support spacing 1.5 m
42  Channel CWP/CWOP40H40/... (CWP40H40/...) Extension bracket WMC/WMCO...(WMC...) or WWS/WWSO...(WWS...) Bolt SMM10x20 + Washer PP10 - maximum extension bracket load capacity 30 kg - maximum extension bracket length 400 mm - maximum support spacing 1.5 m	43  I-beam bracket adapter OD Bolt SMM10x20 + Washer PP10 Angle rod hanger WKPO Threaded rod PGM... Nut NSM... + Washer PP... Bracket UPWK/UPWKO (UPWK) Bolt SGK8x16 Extension bracket WWCH... I-beam fastening clamp NKH I-beam DPH... - maximum extension bracket load capacity 30 kg - maximum extension bracket length 600 mm - maximum support spacing 1.5 m

I-beam fastening clamp NKH

Extension bracket WWCH...

I-beam DPH...

- maximum extension bracket load capacity 30 kg
- maximum extension bracket length 600 mm
- maximum support spacing 1.5 m

Triangular bracket UTM.UTMO (UTM)

- maximum load capacity of the structure 30 kg
- the cables should be fixed with UK1/UKO1 (UK1) brackets max every 600 mm
- maximum rack width 600 mm
- maximum support spacing 1.5 m

46

Profile PMC/PMCO... (PMC...)

- maximum load capacity of the structure 22.5 kg
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 mm - 600 mm
- maximum support spacing 1.5 m

41

Mesh tray hanger WKS/WKSO60 (WKS60)

- maximum load capacity of the structure 2.25 kg
- maximum support spacing 1.5 m
- maximum tray width 60 mm

48

Clamp ZSW

- maximum load capacity of the structure 3 kg
- maximum support spacing 1.5 m
- maximum tray width 60 mm

49

USKPH100

- maximum load capacity of the structure 3 kg
- maximum support spacing 1.5 m
- maximum tray width 60 mm

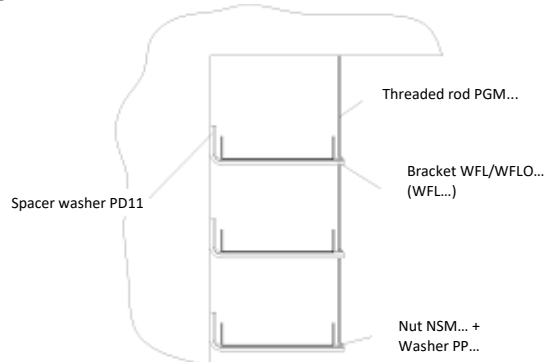
50

- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 mm - 600 mm
- maximum support spacing 1.5 m

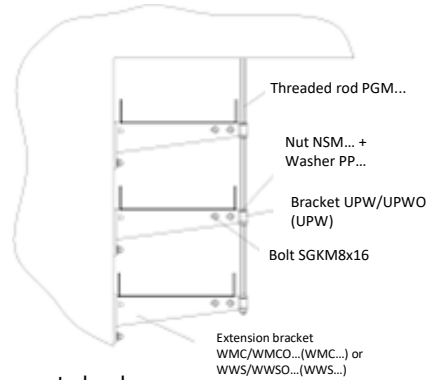
USKPH100

Tray width [mm]	Max. Load [kg/m]	USKPH100 [pcs.]
600	15	3
500	15	3
400	15	3
300	10	2
200	10	2
100	5	1

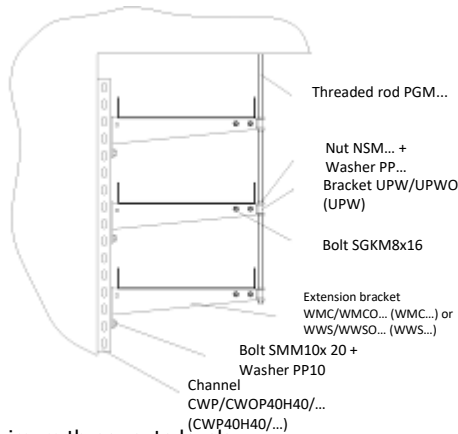
Wall and ceiling structures

51

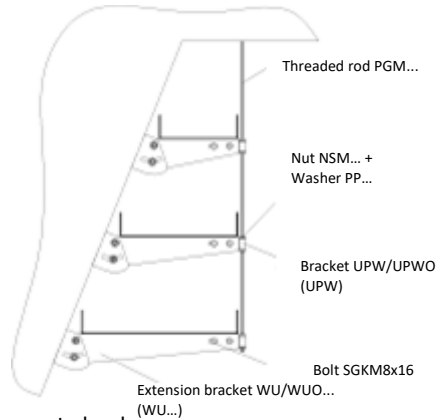
- maximum three route levels
- maximum load of bracket/extension bracket 30 kg
- maximum load capacity of the structure 75 kg
- maximum length of bracket/extension bracket 400 mm
- maximum support spacing 1.5 m

52

- maximum three route levels
- maximum extension bracket load capacity 37,5 kg
- maximum load capacity of the structure 97.5 kg
- maximum extension bracket length 600 mm (400 mm for WMC/WMCO (WMC))
- maximum support spacing 1.5 m

53

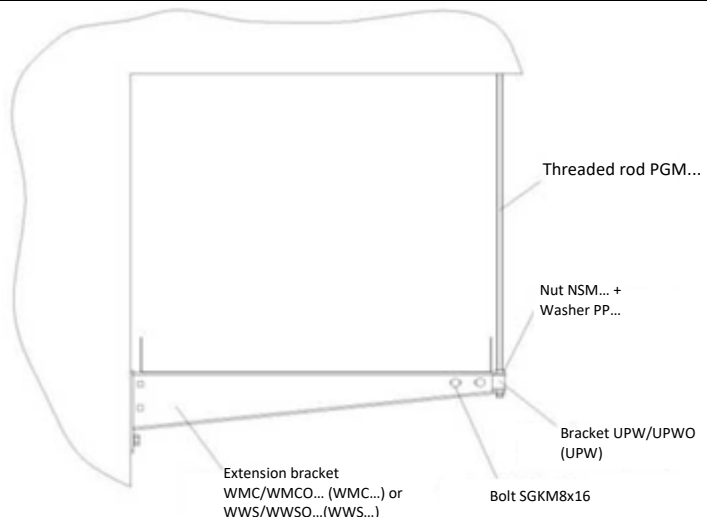
- maximum three route levels
- maximum extension bracket load capacity 30 kg
- maximum load capacity of the structure 90 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

54

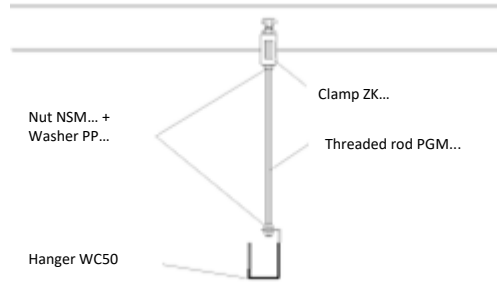
- maximum three route levels
- maximum extension bracket load capacity 30 kg
- maximum load capacity of the structure 90 kg
- maximum extension bracket length 400 mm
- maximum support spacing 1.5 m

55

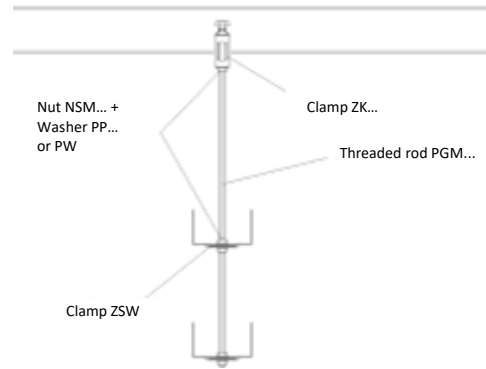
- maximum one route level
- maximum load capacity of the structure 37.5 kg
- maximum extension bracket length 600 mm
- maximum support spacing 1.5 m



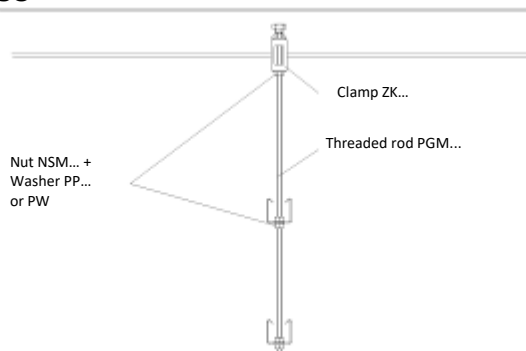
Fixing to steel structure

56

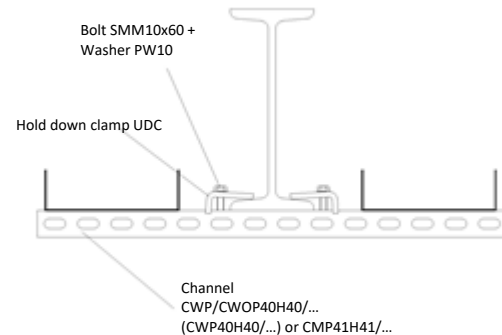
- maximum load per hanger 7.5 kg
- maximum support spacing 1.5 m
- for tray widths of 50 mm

57

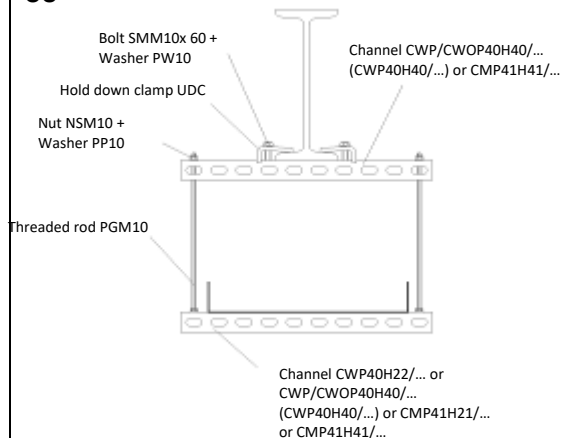
- maximum two route levels
- maximum load capacity per level 15 kg
- maximum load capacity of the structure 15 kg
- maximum tray width 100 mm
- maximum support spacing 1.5 m

58

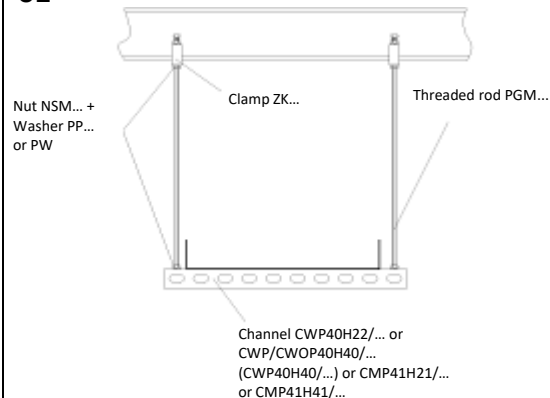
- maximum two route levels
- maximum load capacity of the structure 15 kg
- maximum load capacity per level 7.5 kg
- maximum support spacing 1.5 m
- possibility to fix fire safety system devices (up to 3,5 kg) to the channel base

59

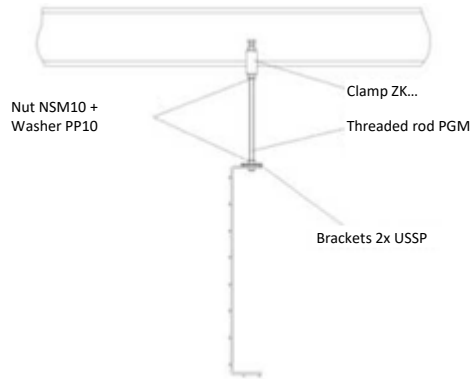
- single-sided construction allowed
- maximum one-sided load capacity of the channel 15 kg
- maximum load capacity of the structure 30 kg
- maximum width per route 200 mm
- maximum support spacing 1.5 m

60

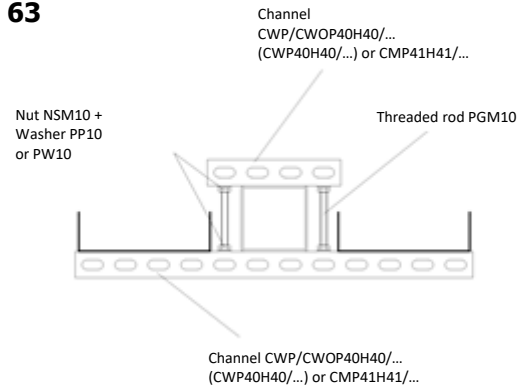
- maximum one route level
- maximum load capacity of the structure 15 kg
- maximum support spacing 1.5 m
- maximum route width 400 mm

61

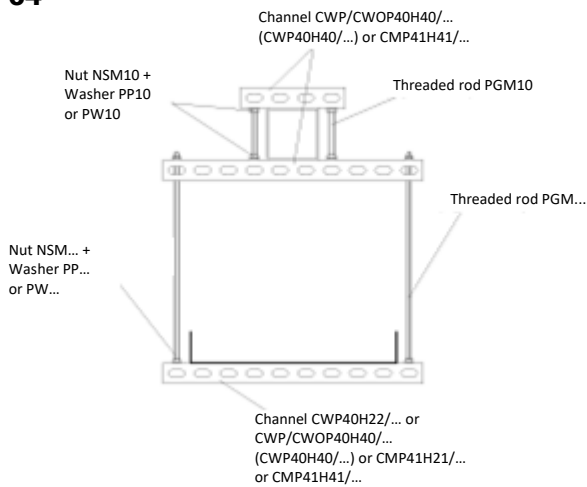
- maximum one route level
- maximum load capacity of the structure 30 kg
- maximum support spacing 1.5 m
- maximum route width 400 mm

62

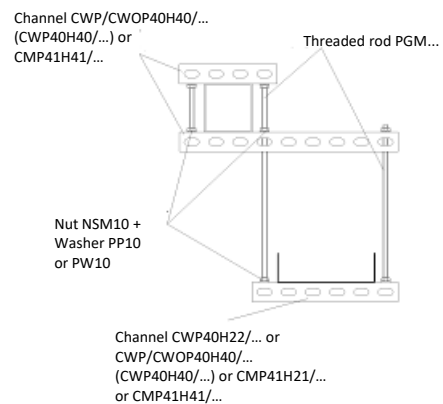
- maximum load capacity of the structure 12 kg
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 mm - 600 mm
- maximum support spacing 1.2 m

63

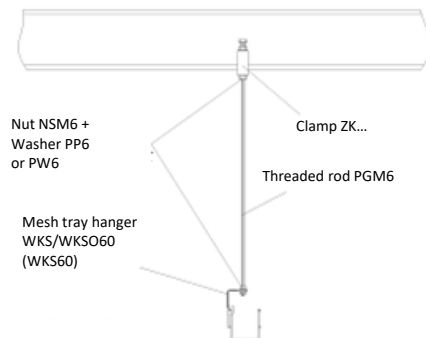
- single-sided construction allowed
- maximum one-sided load capacity of the channel 15 kg
- maximum load capacity of the structure 30 kg
- maximum width per route 200 mm
- maximum support spacing 1.5 m

64

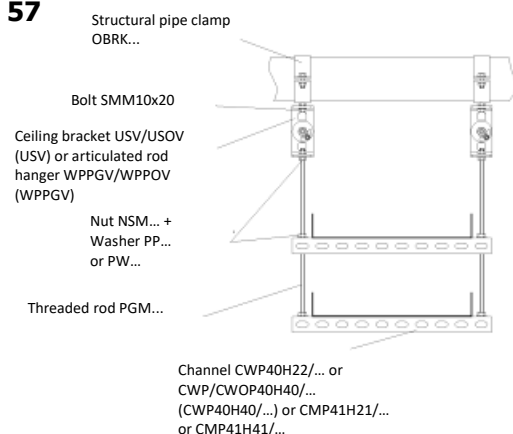
- maximum one route level
- maximum load capacity of the structure 15 kg
- maximum route width 400 mm
- maximum support spacing 1.5 m

65

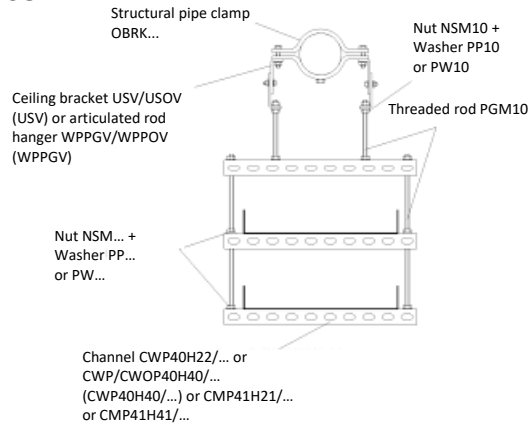
- maximum one route level
- maximum load capacity of the structure 15 kg
- maximum route width 200 mm
- maximum support spacing 1.5 m

66

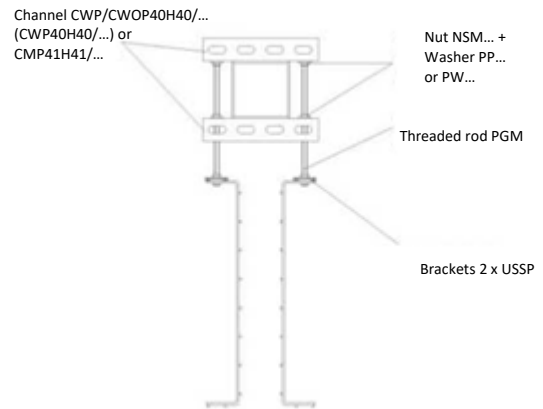
- maximum load per hanger 2.25 kg
- maximum support spacing 1.5 m
- maximum tray width 60 mm

57

- maximum two route levels
- maximum load capacity per level 15 kg
- maximum load capacity of the structure 30 kg
- maximum route width 400 mm
- maximum support spacing 1.5 m

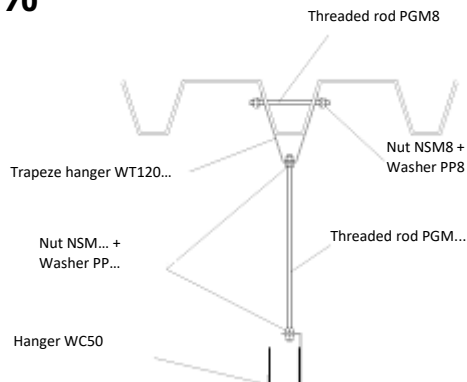
68

- maximum two route levels
- maximum load capacity per level 15 kg
- maximum load capacity of the structure 30 kg
- maximum route width 400 mm
- maximum support spacing 1.5 m

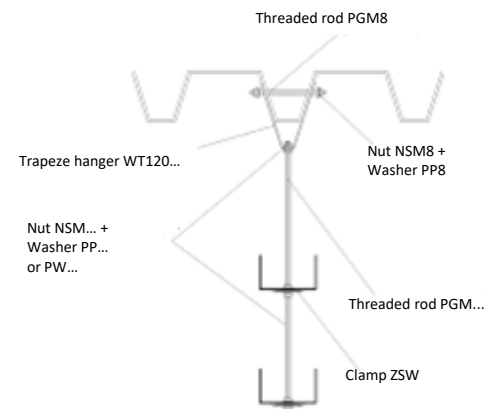
69

- maximum load per tray - 10 kg/m
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 mm - 400 mm
- maximum support spacing 1.2 m
- single tray construction allowed

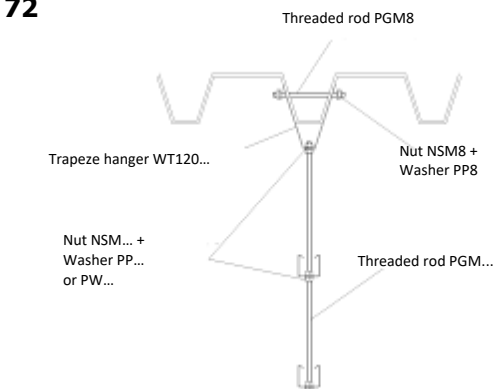
Fixing to trapezoidal sheet

70

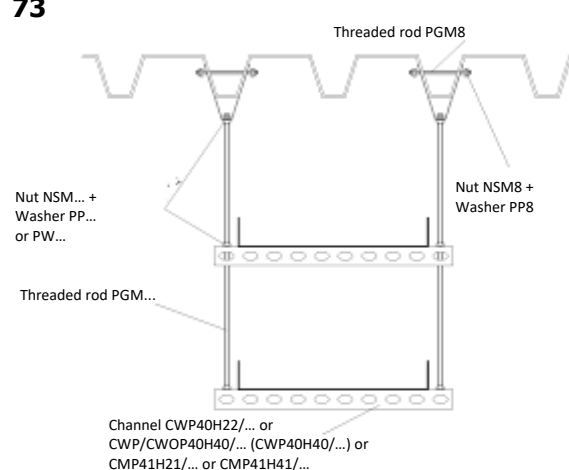
- maximum load per hanger 7.5 kg
- maximum support spacing 1.5 m
- for tray widths of 50 mm

71

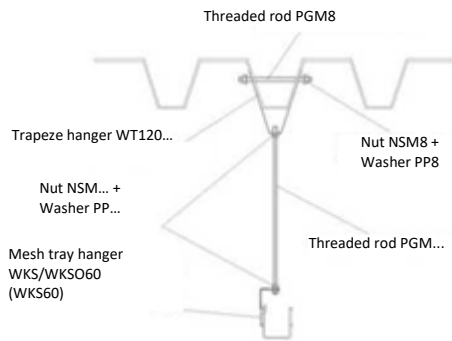
- maximum two route levels
- maximum load capacity per level 15 kg
- maximum load capacity of the structure 15 kg
- maximum tray width 100 mm
- maximum support spacing 1.5 m

72

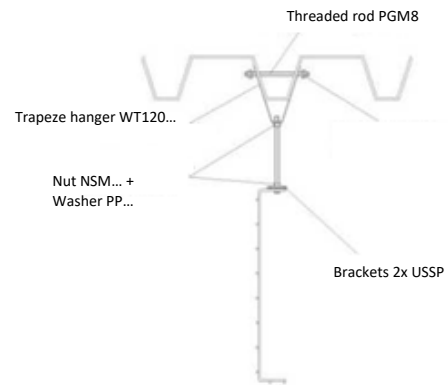
- maximum two route levels
- maximum load capacity of the structure 15 kg
- maximum load capacity per level 7.5 kg
- maximum support spacing 1.5 m
- possibility to fix fire safety system devices (up to 3,5 kg) to the channel base

73

- maximum two route levels
- maximum load capacity per level 15 kg
- maximum load capacity of the structure 30 kg
- maximum support spacing 1.5 m
- maximum route width 400 mm

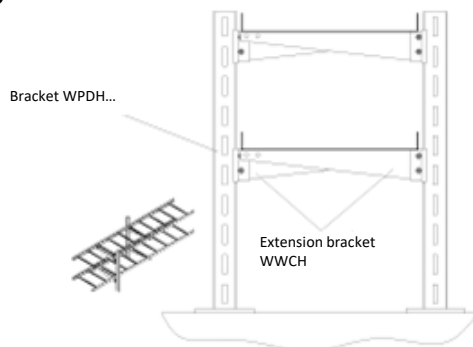
74

- maximum load capacity of the structure 2.25 kg
- maximum support spacing 1.5 m
- maximum tray width 60 mm

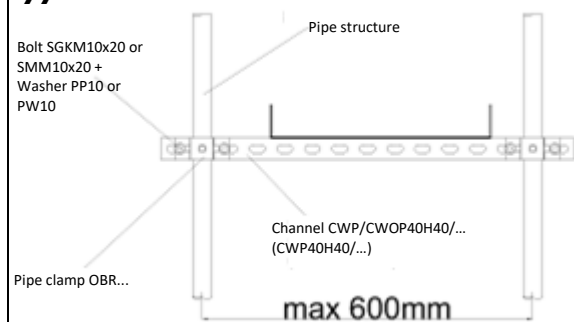
75

- maximum load capacity of the structure 12 kg
- the cables should be fixed with UKZ1/UKZO1 (UKZ1) brackets max every 600 mm
- for tray widths of 100 mm - 400 mm
- maximum support spacing 1.2 m

Fixing to floor or elevated floor structure

76

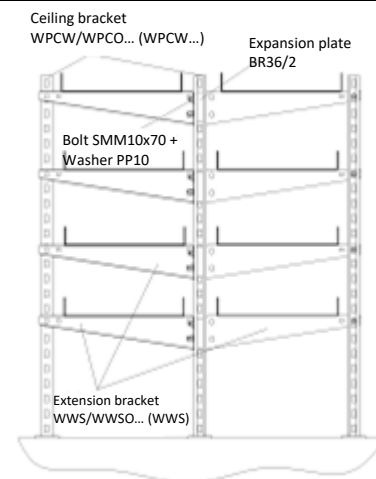
- maximum two route levels
- maximum load capacity per level 40 kg
- maximum load capacity of the structure 80 kg
- maximum route width 600 mm
- maximum support spacing 1.0 m

77

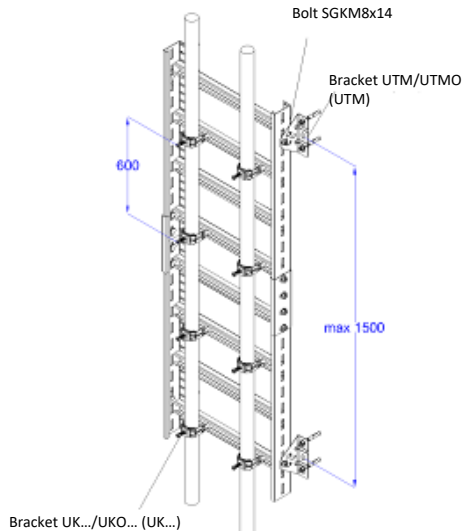
- maximum load capacity of the structure 24 kg
- maximum support spacing 1.2 m

78

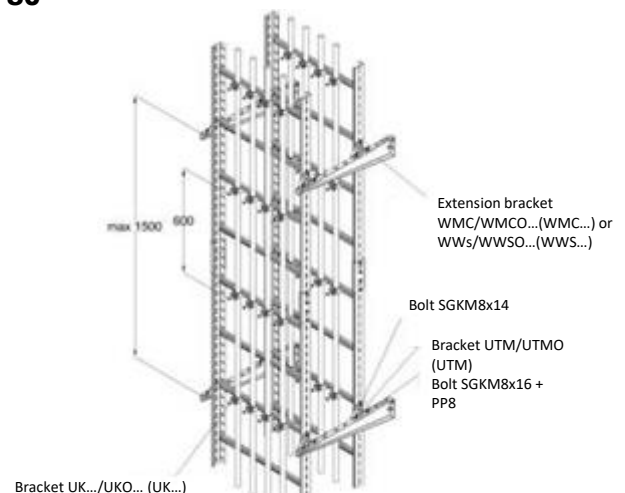
- maximum four route levels
- maximum load per route 30 kg
- maximum load capacity of the structure 240 kg
- maximum route width 400 mm
- maximum height of the brackets 1,5 m
- maximum support spacing 1.5 m
- it is possible to run routes on one side of the structure



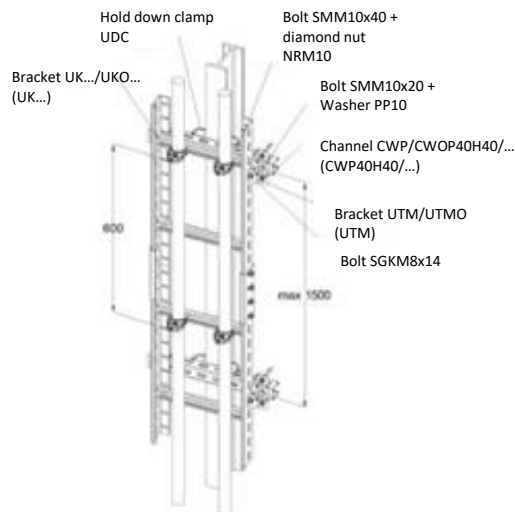
Vertical structures

79

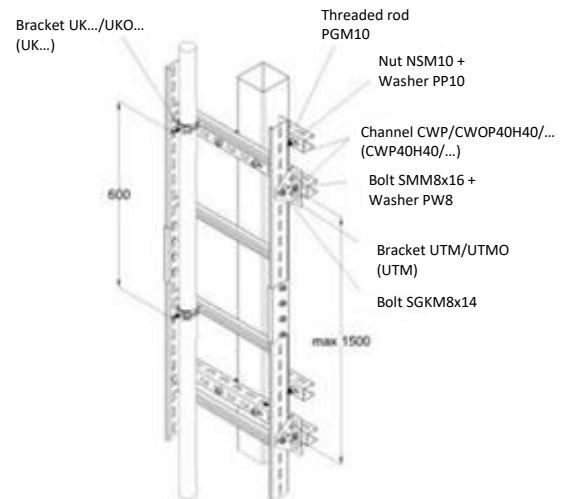
- maximum load capacity of the support structure 30 kg
- maximum rack width 600 mm
- fixing the rack upside down horizontally on the ceiling is permitted

80

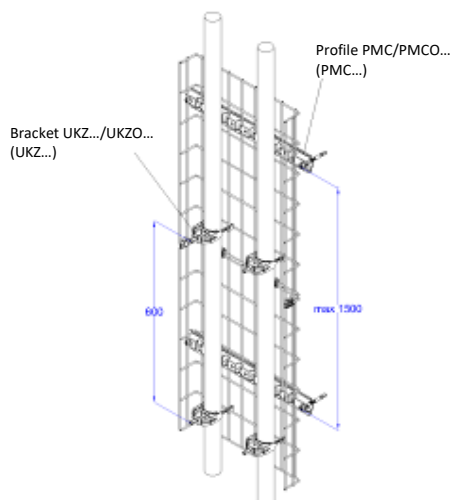
- maximum load capacity of the support structure 60 kg
- maximum load capacity per rack 30 kg
- maximum rack width 600 mm
- fixing the rack upside down horizontally on the ceiling is permitted

81

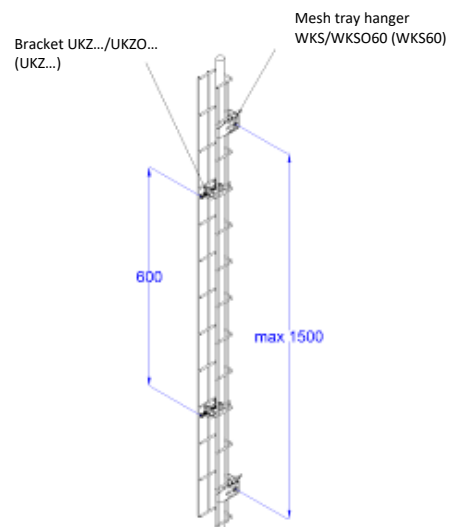
- maximum load capacity of the support structure 30 kg
- maximum rack width 400 mm

82

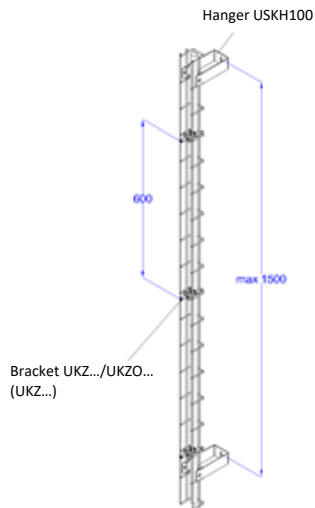
- maximum load capacity of the support structure 30 kg
- maximum rack width 400 mm

83

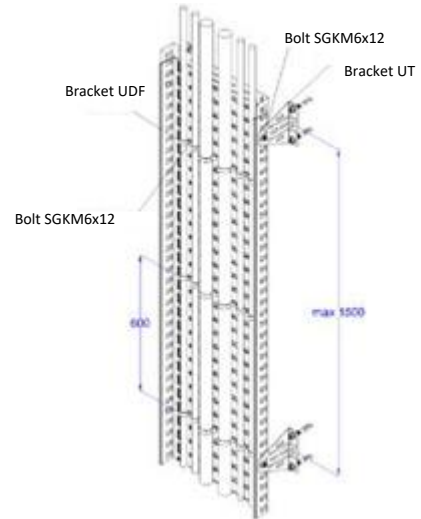
- maximum load capacity of the support structure 30 kg
- for tray width of 100-600 mm
- fixing the tray upside down horizontally on the ceiling is permitted

84

- maximum load capacity of the support structure 3 kg
- fixing the tray upside down horizontally on the ceiling is permitted
- maximum tray width 60 mm

85

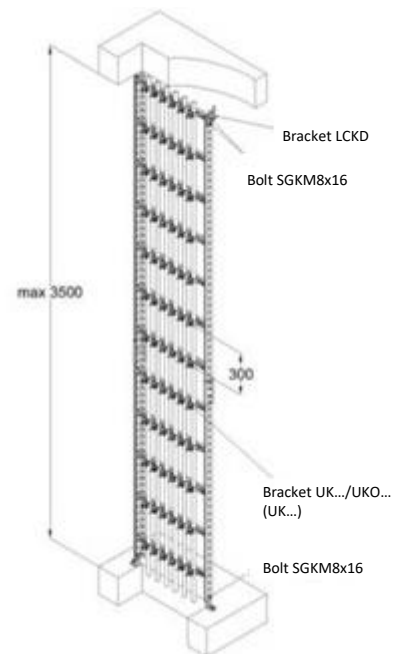
- maximum load capacity of the support structure 3 kg
- fixing the tray upside down horizontally on the ceiling is permitted
- maximum tray width 60 mm

86

- maximum load capacity of the support structure 30 kg
- maximum tray width 400 mm
- fixing the tray upside down horizontally on the ceiling is permitted

87

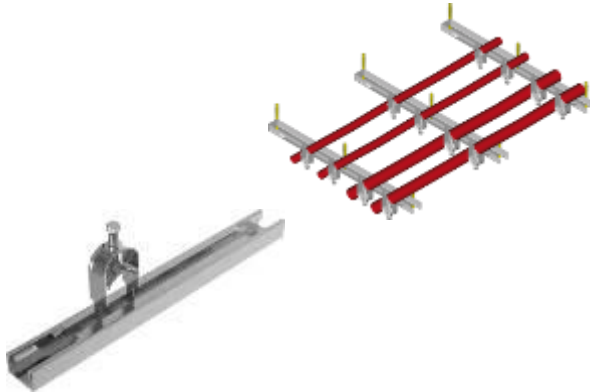
- maximum rack load - 20 kg/m
- maximum rack width 600 mm



SD/SDO...(SD) + UK/UKO...(UK)**U1**

Rung + bracket

- rung spacing max. 600 mm
- vertical and horizontal cable/conductor routing
- cable/conductor routing on walls and ceilings

**CMSC41H21 + UK/UKO...(UK)****U2**

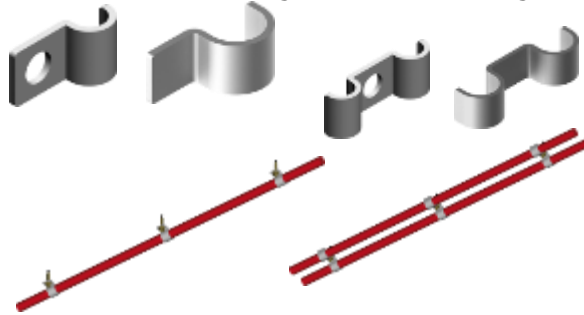
channel + bracket

- distance between channels max. 800 mm
- vertical and horizontal cable/conductor routing
- cable/conductor routing on walls and ceilings

**UDF..., UEF...****U3**

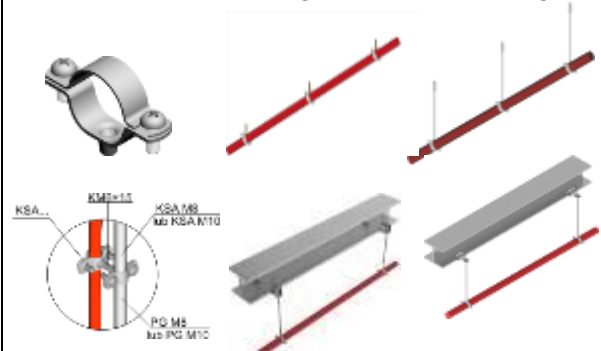
Cable clip

- bracket spacing max. 600 mm
- vertical and horizontal cable/conductor routing
- cable/conductor routing on walls and ceilings

**KSA...****U4**

Cable clamp

- clamps spacing max. 600 mm
- vertical and horizontal cable/conductor routing
- cable/conductor routing on walls and ceilings

**KSA...****U5**

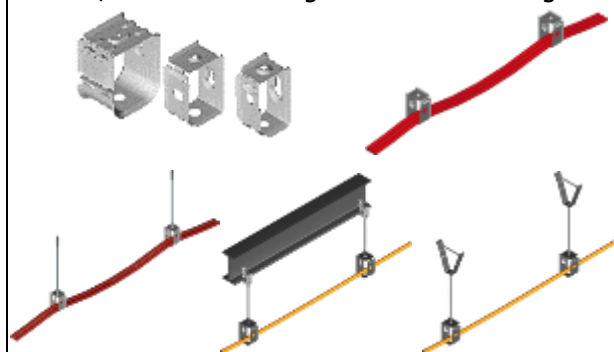
Cable clamp

- clamps spacing max. 600 mm
- cable/conductor routing vertical and horizontal
- cable/conductor routing on walls and ceilings

**OZ/OZO(OZ), OZS/OZSO(OZS), OZM/OZMO(OZM)****U6**

Cable clamp

- clamps spacing max. 600 mm
- cable/conductor routing, horizontal
- cable/conductor routing on walls and ceilings



**OZ/OZO(OZ), OZS/OZSO(OZS),
OZM/OZMO(OZM)****U7**

Cable clamp

- clamps spacing max. 800 mm
- cable/conductor routing, horizontal
- cable/conductor routing on walls and ceilings

**RU... + KSA/OBS****U8**

Thin-walled pipe

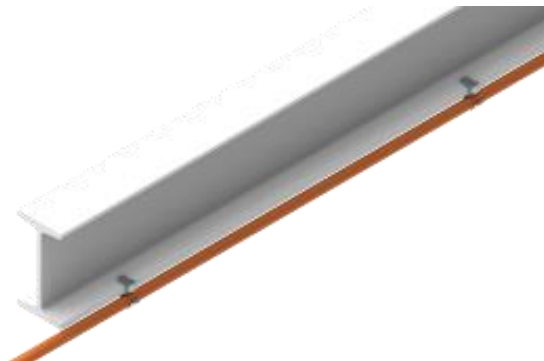
- Clamps spacing max. 1.5 m
- cable/conductor routing, horizontal
- cable/conductor routing on walls and ceiling

**ZSK1**

Clamp

U9

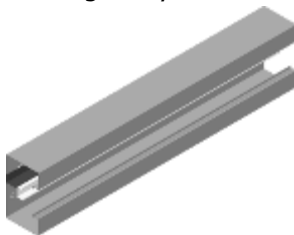
- clamps spacing max. 600 mm
- cable/conductor routing, horizontal
- fixing to steel structure

**KS...H68**

Wall trunking

N

- width 115 – 170 mm
- mounting every 0.8 m



CLASSIFICATION OF CABLE SYSTEMS ON SPECIAL CABLE SUPPORT STRUCTURES

Annex 2 Table 1. **Group K1** cables classification - Special support structures - **KGL/KGOL...H60, KCL/KCOL...H60**

	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
BITNER	NHXXH E90 = NHXXH-J E90			E90	E90	E90	E60	E90	E90	E60	E90			E90	E90			E90	
	(N)HXH E90 = (N)HXH-J E90			E90	E90	E90		E90	E90		E90			E90	E90			E90	
	NHXCH E90			E90		E90			E90		E90			E90	E90			E90	
	(N)HXCH E90			E60	E30	E60		E30	E60		E60			E60	E60			E60	
	BiTflame 1000 E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	BiTflame 1000 C E90			E90		E90			E90		E90			E90	E90			E90	
	BiTflame S E90			E90		E90			E90		E90			E90	E90			E90	
	BiTservo FS E90			E30	E30	E30		E30	E30		E30			E30	E30			E30	
	HDGs E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	HDGsekwf E90	E90			E90			E90					E90				E90		
	HTKSH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	HTKSHekw E90	E90		E60	E60	E60		E60	E60		E60		E90	E60	E60		E90	E60	
	HLGs(z0)			E60		E60			E60		E60			E60	E60			E60	
DĄTWYLE R	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	(N)HXH			E60	E30	E60		E30	E60		E60			E60	E60			E60	
	(N)HXCH			E60	E30	E60		E30	E60		E60			E60	E60			E60	
ELKOND	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	JE-H(st)H				E90			E90											
	1-CXKH-V (1.5-10mm ²)			E90	E90	E90		E90	E90		E90			E90	E90			E90	
	SHXKFH-V180			E90	E90	E90		E90	E90		E90			E90	E90			E90	
ELPAR	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	(N)HXH = (N)HXH-J				E60			E60											
	NHXCH				E30			E30											
	HDGs				E30			E30											
	HTKSH				E30			E30											
EUPEN	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	(N)HXH = (N)HXH-J			E30		E30			E30		E30			E30	E30			E30	
	(N)HXCH			E90		E90			E90		E90			E90	E90			E90	
KABLOTEK	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	NHXCH			E90		E90			E90		E90			E90	E90			E90	
MADEX	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	NHXXH - NHXXH-J			E60		E60			E60		E60			E60	E60			E60	
	NHXCH			E90		E90			E90		E90			E90	E90			E90	
NKT	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	NHXXH = NHXXH-J			E90		E90			E90		E90			E90	E90			E90	

PRAKAB	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	(N)HXH			E90	E90	E90		E90	E90		E90			E90	E90			E90	
	SSKFH-V180			E60	E90	E60		E90	E60		E60			E60	E60			E60	
TECHNOKABEL	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	NHXH E90 = NHXH-J E90	E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90		E90	E90	
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	NHXCH E90			E60	E90	E60		E90	E60		E60			E60	E60			E60	
	(N)HXCH E90			E90	E90	E90	E90	E90	E90	E90	E90			E90	E90			E90	
	JE-H(St)H E30 - E90		E90	E90		E90			E90		E90	E90		E90	E90	E90		E90	
	HDGs E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	HDGs-W E30-E90			E90	E90	E90	E90	E90	E90	E90	E90			E90	E90			E90	
	HDGsekw E30-E90	E30											E30				E30		
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
TELEFONIKA	Cable type	1	3	5-12	13-22	30-32	34-35	36-42	51-53	54	55	56	57	60-61	64-68	70	71	73	76-78
	FLAME-X 950 NHXH E90= NHXH-J E90				E60			E60											
	FLAME-X 950 NHXCH E90				E60			E60											
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90		E90	E90	E60
	FLAME-X 950 (N)HXCH E90	E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90		E90	E90	E90
	JE-H(St)H	E30		E90		E90	E90		E90	E90	E90		E30	E90	E90		E30	E90	
	FLAME-X 950 HDGs E30-E90	E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90		E90	E90	E90
	FLAME-X 950 HTKSH E90	E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90		E90	E90	E90
	FLAME-X 950 HTKShekw E90	E60		E90	E60	E90	E90	E60	E90	E90	E90		E60	E90	E90		E60	E90	E60

Annex 2 Table 2. **Group K2** cable classification - Special support structures - **KGL100H42, KCL100H42**

BITNER	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-68	73
	Bitflame 1000 E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	Bitflame 1000 C E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E90	E90		E90		E90	E90	E90	E90	E90
	HTKSH E90	E60	E90	E60	E90	E60	E60	E60	E60	E60
TECHNOKABEL	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-68	73
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs-W E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGsekw E30-E90	E60		E60		E60	E60	E60	E60	E60
	HDGsekw-W E30-E90		E90		E90					
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90		E90		E90	E90	E90	E90	E90
TELEFONIKA	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-68	73
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 (N)HXCH E90		E90		E90					
	FLAME-X 950 HDGs E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HTKSH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HTKSHekw E90	E60	E60	E60	E60	E60	E60	E60	E60	E60

Annex 2 Table 3. **K3** cable classification - Special support structures - **CWP/CWOP40H40**

BITNER	Cable type	4	58	72
	HDGs E90	E90	E90	E90
	HDGsekwf E90	E90	E90	E90
	HTKSH E90	E90	E90	E90
	HTKSHekw E90	E90	E90	E90
TECHNOKABEL	Cable type	4	58	72
	HDGs E30-E90	E90	E90	E90
	HTKSH E30-E90	E90	E90	E90
	HTKSHekw E30-E90	E60	E60	E60
TELEFONIKA	Cable type	4	58	72
	JE-H(St)H	E90	E90	E90

Annex 2 Table 4. **Group K4** cable classification - Special support structures - **KFL...H60**

BITNER	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	(N)HXH E90 = (N)HXH-J E90		E90		E30		E30			E90					E90		
	Bitflame 1000 E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90	E90		E90
	HDGs E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90	E90		E90
	HTKSH E90		E90	E30	E90	E30	E90	E30	E30	E90		E30	E30	E30	E90		E30
DÄTWYLER	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	(N)HXH		E60	E30	E60	E30	E60	E30	E30	E60		E30	E30	E30	E60		E30
	(N)HXCH				E90		E90										
	JE-H(St)H				E30		E30										
ELKOND	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	NHXXH = NHXXH-J (1.5-10mm ²)		E90		E30		E30			E90					E90		
	1-CXKH-V (1.5-10mm ²)	E90	E90	E30	E90	E30	E90	E30	E30	E90	E90	E30	E30	E30	E90	E90	E30
	SSKFFH-V180 P60	E30	E30							E30	E30				E30	E30	
	SHKFFH-V180 P90		E90							E90					E90		
	SHXXFFH-V180	E90			E60		E60				E90					E90	
EUPEN	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	(N)HXH = (N)HXH-J				E90		E90										
	(N)HXCH				E90		E90										
	JE-H(st)H				E30		E30										
ERSE	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	(N)HXH = (N)HXH-J			E90		E90		E90	E90			E90	E90	E90			E90
	(N)HXCH			E90		E90		E90	E90			E90	E90	E90			E90
	JE-H(st)H			E90		E90		E90	E90			E90	E90	E90			E90
STUDER	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	(N)HXH = (N)HXH-J				E30		E30										
	(N)HXCH				E30		E30										
	(N)HXCH E30				E30		E30										
	JE-H(St)H				E30		E30										
	JE-H(St)HRH				E30		E30										
TECHNOKABEL	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	NHXXH E90 = NHXXH-J E90		E90		E90		E90			E90					E90		
	NHXXH E90		E90							E90					E90		
	(N)HXH E90 = (N)HXH-J E90	E90		E60	E90	E60	E90	E60	E60		E90	E60	E60	E60		E90	E60
	NHXXH E90	E90			E90		E90				E90					E90	
	(N)HXCH E90			E90		E90		E90	E90			E90	E90	E90			E90
	(N)HXCH-J SERVO E90				E90		E90										
	HDGs E30-E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90	E90		E90
	HDGs-W E30-E90			E90	E90	E90	E90	E90	E90			E90	E90	E90			E90

TELEFONIKA	HDGszo-W E30-E90				E90		E90										
	HTKSH E30-E90		E90	E90	E90	E90	E90	E90	E90	E90		E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90			E60	E90	E60	E90	E60	E60			E60	E60	E60	E60	E90	E60
	Cable type	1	3	5-12	13-22	30-32	36-42	51-53	55	56	57	60-61	64-65	67-68	70	71	73
	FLAME-X 950 NHXH E90 = NHXH-J E90				E90		E90										
	FLAME-X 950 (N)HXH E90 = (N)HXH-J E90			E90	E90	E90	E90	E90	E90			E90	E90	E90			E90
	FLAME-X 950 (N)HXCH E90		E60	E90	E60	E90	E60	E90	E90	E60		E90	E90	E90	E60		E90
	JE-H(St)H			E90	E90	E90	E90	E90	E90			E90	E90	E90			E90
	FLAME-X 950 HDGs E30-E90		E90	E90	E30	E90	E30	E90	E90	E90		E90	E90	E90	E90		E90
	FLAME-X 950 HTKSH E90		E30	E90	E30	E90	E30	E90	E90	E30		E90	E90	E90	E30		E90
	FLAME-X 950 HTKSHekw E90			E60		E60		E60	E60			E60	E60	E60			E60

Annex 2 Table 5. **Group K5** cable classification - Special support structures - **KLFL75H60**

BITNER	Cable type	2
	BiTflame 1000 E90	E90
	HDGs E90	E90
	HTKSH E90	E90
TECHNOKABEL	Cable type	2
	NHXH E90 = NHXH-J E90	E90
	HDGs E30-E90	E90
	HTKSH E30-E90	E90

Annex 2 Table 6. **Group K6** cable classification - Special support structures - **KBL...H60**

BITNER	Cable type	5-12	30-32	34-35	51-53	54	55	60-61	64-68	73
	(N)HXH E90 = (N)HXH-J E90	E90	E90		E90		E90	E90	E90	E90
	BiTflame 1000 E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
TECHNOKABEL	Cable type	5-12	30-32	34-35	51-53	54	55	60-61	64-68	73
	NHXH E90 = NHXH-J E90	E30	E30		E30		E30	E30	E30	E30
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E30-E90	E90	E90	E60	E90	E60	E90	E90	E90	E90
	HTKSH E30-E90	E90	E90	E60	E90	E60	E90	E90	E90	E90
TELEFONIKA	Cable type	5-12	30-32	34-35	51-53	54	55	60-61	64-68	73
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E30	E90	E30	E90	E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E30	E30	E90	E30	E90	E30	E30	E30	E30
	JE-H(St)H	E60	E60	E60	E60	E60	E60	E60	E60	E60
	FLAME-X 950 HDGs E30-E90	E30	E30	E90	E30	E90	E30	E30	E30	E30
	FLAME-X 950 HTKSH E90	E30	E30	E60	E30	E60	E30	E30	E30	E30
	FLAME-X 950 HTKSHekw E90	E30	E30	E60	E30	E60	E30	E30	E30	E30

Annex 2 Table 7. **Group K7** cables classification - Special support structures - **KGJ/KGOJ.H60, KCJ/KCOJ.H60**

BITNER	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXH E90 = NHXH-J E90	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXH E90 = (N)HXH-J E90	E90		E90				E90		E90	E90	E90	E90	E90		
	NHXCH E90	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXCH E90	E60		E60				E60		E60	E60	E60	E60	E60		
	BiTflame 1000 E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90		
	BiTflame 1000 C E90	E60	E90	E60			E90	E60		E60	E60	E60	E60	E60		
	BiTflame S E90	E90		E90				E90		E90	E90	E90	E90	E90		
	BiTflame AS E90	E90		E90				E90		E90	E90	E90	E90	E90		
	BiTflame AS(St) E90	E90		E90				E90		E90	E90	E90	E90	E90		
	BiTservo FS E90	E60		E60				E60		E60	E60	E60	E60	E60		
	BiTservo FS MICA E90	E30		E30				E30		E30	E30	E30	E30	E30		
	HDGs E90	E30	E30	E30			E30	E30		E30	E30	E30	E30	E30		
	HDGsekwf E90	E90		E90				E90		E90	E90	E90	E90	E90		
	HTKSH E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90		
	HTKSHekw E90	E90		E90				E90		E90	E90	E90	E90	E90		
	HLGs(z0)	E60		E60				E60		E60	E60	E60	E60	E60		

DÄTWYLER	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	(N)HXH	E90	E30	E90			E30	E90		E90	E90	E90	E90	E90		
	(N)HXCH	E90	E30	E90			E30	E90		E90	E90	E90	E90	E90		
	JE-H(St)H	E30	E30	E30			E30	E30		E30	E30	E30	E30	E30		
ELKOND	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	1-CXKH-V (1.5-10mm ²)	E90		E90				E90		E90	E90	E90	E90	E90		
	SSKFH-V180	E30		E30				E30		E30	E30	E30	E30	E30		
	SHXKFH-V180	E90		E90				E90		E90	E90	E90	E90	E90		
ELPAR	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXXH = NHXXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXH = (N)HXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	NHXCH	E60		E60				E60		E60	E60	E60	E60	E60		
	(N)HXCH	E90		E90				E90		E90	E90	E90	E90	E90		
	HDGs	E30		E30				E30		E30	E30	E30	E30	E30		
	HTKSH	E30		E30				E30		E30	E30	E30	E30	E30		
EUPEN	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	(N)HXH = (N)HXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXCH	E90		E90				E90		E90	E90	E90	E90	E90		
	JE-H(st)H	E90		E90				E90		E90	E90	E90	E90	E90		
ERSE	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	(N)HXH = (N)HXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXCH	E90		E90				E90		E90	E90	E90	E90	E90		
	JE-H(st)H	E90		E90				E90		E90	E90	E90	E90	E90		
KABLOTEK	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXXH = NHXXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	JE-H(St)H	E90		E90				E90		E90	E90	E90	E90	E90		
	LINCH	E90		E90				E90		E90	E90	E90	E90	E90		
MADEX	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXXH - NHXXH-J	E90		E90				E90		E90	E90	E90	E90	E90		
	HTKSH	E30		E30				E30		E30	E30	E30	E30	E30		
	HTKSHekw	E30		E30				E30		E30	E30	E30	E30	E30		
NKT	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXXH = NHXXH-J	E90		E90				E90		E90	E90	E90	E90	E90		

PRAKAB	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	PRAFlaDur 1-CCXKH-V180	E30		E30				E30		E30	E30	E30	E30	E30		
	(N)HXH	E90		E90				E90		E90	E90	E90	E90	E90		
	SSKFH-V180	E90		E90				E90		E90	E90	E90	E90	E90		
STUDER	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	(N)HXH = (N)HXH-J	E60		E60				E60		E60	E60	E60	E60	E60		
	(N)HXCH	E90		E90				E90		E90	E90	E90	E90	E90		
	JE-H(St)H	E60		E60				E60		E60	E60	E60	E60	E60		
TECHNOKABEL	JE-H(St)HRH	E90		E90				E90		E90	E90	E90	E90	E90		
	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	NHXH E90 = NHXH-J E90	E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	NHXHX E90	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E30
	NHXCH E90	E90		E90				E90		E90	E90	E90	E90	E90		
	(N)HXCH E90	E90		E90		E90		E90	E90	E90	E90	E90	E90	E90		
	(N)HXCH-J SERVO E90	E90		E90				E90		E90	E90	E90	E90	E90		
	NHXHRHX E90 = NHXHRHX-J E90	E90		E90				E90		E90	E90	E90	E90	E90		
	JE-H(St)H E30 - E90	E60		E60				E60		E60	E60	E60	E60	E60		
	HDGs E30-E90	E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90		E90
	HDGs-W E30-E90	E90		E90				E90		E90	E90	E90	E90	E90	E90	E90
	HDGszo E30-E90	E90		E90				E90		E90	E90	E90	E90	E90		
	HDGszo-W E30-E90	E60		E60				E60		E60	E60	E60	E60	E60		
	HTKSH E30-E90	E90	E60	E90		E90	E60	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKShekw E30-E90	E90		E90				E90		E90	E90	E90	E90	E90		
TELEFONIKA	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	86
	FLAME-X 950 NHXH E90= NHXH-J E90	E90		E90				E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 NHXCH E90	E60		E60				E60		E60	E60	E60	E60	E60		
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 (N)HXCH E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	
	JE-H(St)H	E90		E90				E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 HDGs E30-E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 HTKSH E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 HTKShekw E90	E90		E90				E90		E90	E90	E90	E90	E90		
	HLGsekwf	E60		E60				E60		E60	E60	E60	E60	E60		

Annex 2 Table 8. **Group K8** cable classification - Special support structures - **KFJ...H60**

	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
BITNER	NHXXH E90 = NHXXH-J E90		E90		E90		E90	E90		E90	E90	E90		E90
	(N)HXH E90 = (N)HXH-J E90		E60		E60		E60	E60		E60	E60	E60		E60
	BiTflame 1000 E90		E90		E90		E90	E90		E90	E90	E90		E90
	BiTservo FS E90		E90		E90		E90	E90		E90	E90	E90		E90
	HDGs E90		E90		E90		E90	E90		E90	E90	E90		E90
	HTKSH E90		E90		E90		E90	E90		E90	E90	E90		E90
	HLGs(zö)		E30		E30		E30	E30		E30	E30	E30		E30
DÄTWYLER	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	(N)HXH		E30	E90	E30	E90	E30	E30		E30	E30	E30		E30
	(N)HXCH		E30	E90	E30	E90	E30	E30		E30	E30	E30		E30
	JE-H(St)H			E30		E30								
ELKOND	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	NHXXH = NHXXH-J			E90		E90								
	1-CXKH-V		E30	E60	E30	E60	E30	E30		E30	E30	E30		E30
	SSKFFH-V180		E30	E90	E30	E90	E30	E30		E30	E30	E30		E30
	SHXXFFH-V180			E90		E90								
EUPEN	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	(N)HXH = (N)HXH-J			E90		E90								
	(N)HXCH			E90		E90								
	JE-H(st)H			E30		E30								
ERSE	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	(N)HXH = (N)HXH-J		E90		E90		E90	E90		E90	E90	E90		E90
	(N)HXCH		E90		E90		E90	E90		E90	E90	E90		E90
	JE-H(st)H		E90		E90		E90	E90		E90	E90	E90		E90
STUDER	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	(N)HXCH			E30		E30								
	(N)HXCH E30			E30		E30								

TECHNOKABEL	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	NHXXH E90 = NHXXH-J E90		E90		E90		E90	E90		E90	E90	E90		E90
	(N)HXXH E90 = (N)HXXH-J E90		E90		E90		E90	E90		E90	E90	E90		E90
	NHXXCH E90	E90	E90		E90		E90	E90	E90	E90	E90	E90	E90	E90
	(N)HXXCH E90		E90		E90		E90	E90		E90	E90	E90		E90
	(N)HXXCH-J SERVO E90		E90		E90		E90	E90		E90	E90	E90		E90
	JE-H(St)H E30 - E90		E90		E90		E90	E90		E90	E90	E90		E90
	HTKSH E30-E90		E90		E90		E90	E90		E90	E90	E90		E90
	HTKSHekw E30-E90		E30		E30		E30	E30		E30	E30	E30		E30
	HLGs E30-E90		E90		E90		E90	E90		E90	E90	E90		E90
	HLGs-W		E60		E60		E60	E60		E60	E60	E60		E60
	HLGsekw E30-E90		E30		E30		E30	E30		E30	E30	E30		E30
TELEFONIKA	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	FLAME-X 950 (N)HXXH E90= (N)HXXH-J E90		E90	E90	E90	E90	E90	E90		E90	E90	E90		E90
	FLAME-X 950 (N)HXXCH E90		E90	E90	E90	E90	E90	E90		E90	E90	E90		E90
	JE-H(St)H		E90	E90	E90	E90	E90	E90		E90	E90	E90		E90
	FLAME-X 950 HDGs E30-E90		E90	E60	E90	E60	E90	E90		E90	E90	E90		E90
	FLAME-X 950 HTKSH E90		E90	E90	E90	E90	E90	E90		E90	E90	E90		E90
	FLAME-X 950 HTKSHekw E90		E90		E90		E90	E90		E90	E90	E90		E90
VLG	Cable type	1	5-12	13-22	30-32	36-42	51-53	55	57	60-61	64-65	67-68	71	73
	(N)HXXH E90		E90		E90		E90			E90	E90	E90		E90
	(N)HXXH E30		E90		E90		E90			E90	E90	E90		E90
	JE-H(St)H E90		E90		E90		E90			E90	E90	E90		E90
	JE-H(St)H E30		E30		E30		E30			E30	E30	E30		E30

Annex 2 Table 9. **Group K9** cable classification - Special support structures - **KBJ...H60**

	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73	76-78
BITNER	(N)HXH E90 = (N)HXH-J E90	E90		E90		E90	E90	E90	E90	E90	E90	
	BiTflame 1000 E90	E90		E90		E90	E90	E90	E90	E90	E90	
	BiTflame S-M(St)	E90		E90		E90	E90	E90	E90	E90	E90	
	HDGs E90	E90		E90		E90	E90	E90	E90	E90	E90	
	HTKSH E90	E90		E90		E90	E90	E90	E90	E90	E90	
ERSE	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73	76-78
	(N)HXH = (N)HXH-J	E90		E90		E90	E90	E90	E90	E90	E90	
	(N)HXCH	E90		E90		E90	E90	E90	E90	E90	E90	
	JE-H(st)H	E90		E90		E90	E90	E90	E90	E90	E90	
TECHNOKABEL	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73	76-78
	NHXH E90 = NHXH-J E90	E90		E90		E90	E90	E90	E90	E90	E90	E30
	(N)HXH E90 = (N)HXH-J E90	E60	E30	E60	E30	E60	E60	E60	E60	E60	E60	
	NHXCH E90	E30		E30		E30	E30	E30	E30	E30	E30	
	(N)HXCH E90	E90	E30	E90	E30	E90	E90	E90	E90	E90	E90	
	(N)HXCH-J SERVO E90	E60		E60		E60	E60	E60	E60	E60	E60	
	HDGs E30-E90	E90		E90		E90	E90	E90	E90	E90	E90	E90
	HDGs-W E30-E90	E90		E90		E90	E90	E90	E90	E90	E90	E90
	HDGszo-W E30-E90	E30		E30		E30	E30	E30	E30	E30	E30	
	HTKSH E30-E90	E30		E30		E30	E30	E30	E30	E30	E30	E90
	HTKSHekw E30-E90	E90		E90		E90	E90	E90	E90	E90	E90	E90
	HLGsekwzo E30-E90	E30		E30		E30	E30	E30	E30	E30	E30	
TELEFONIKA	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73	76-78
	FLAME-X 950 NHXH E90= NHXH-J E90	E60		E60		E60	E60	E60	E60	E60	E60	E60
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E60	E90	E60	E90	E60	E60	E60	E60	E60	E60	E30
	FLAME-X 950 (N)HXCH E90	E60	E60	E60	E60	E60	E60	E60	E60	E60	E60	E60
	N2XH											E60
	JE-H(St)H	E60		E60		E60	E60	E60	E60	E60	E60	E30
	FLAME-X 950 HDGs E30-E90	E60		E60		E60	E60	E60	E60	E60	E60	E30
	FLAME-X 950 HTKSH E90	E30		E30		E30	E30	E30	E30	E30	E30	E30

Annex 2 Table 10. **K10** cable classification - Special support structures - **KCD/KCOD...H60**

BITNER	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	NHXXH E90 = NHXXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90
ELKOND	NHXXCH E90	E90	E90	E90	E90	E90	E90	E90	E90
	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	NHXXH = NHXXH-J (1.5-10mm ²)	E90	E90	E90	E90	E90	E90	E90	E90
	N2XH P30	E60	E60	E60	E60	E60	E60	E60	E60
	N2XH P60	E60	E60	E60	E60	E60	E60	E60	E60
TECHNOKABEL	JE-H(st)H	E60	E60	E60	E60	E60	E60	E60	E60
	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	NHXXH E90 = NHXXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90
	NHXXCH E90	E90	E90	E90	E90	E90	E90	E90	E90
	JE-H(St)H E30 - E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGsekwzo E30-E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90	E90	E90	E90	E90	E90	E90	E90

Annex 2 Table 11. **K11** cable classification - Special support structures - **KCP/KCOP.H60**

BITNER	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	NHXXH E90 = NHXXH-J E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	(N)HXXH E90 = (N)HXXH-J E90	E90		E90	E60			E90		E90		E90		E90	E90	E90
	NHXXCH E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	(N)HXXCH E90	E90		E90				E90		E90		E90		E90	E90	E90
	BiTflame 1000 E90	E90		E90	E60			E90		E90		E90		E90	E90	E90
	BiTflame 1000 C E90	E90		E90				E90		E90		E90		E90	E90	E90
	BiTservo FS E90	E90		E90				E90		E90		E90		E90	E90	E90
	HDGs E90	E90	E30	E90			E30	E90		E90		E90		E90	E90	E90
	HDGsekwf E90	E90		E90				E90		E90		E90		E90	E90	E90
	HTKSH E90	E90		E90				E90		E90		E90		E90	E90	E90
	HTKSHekw E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
DÄTWYLER	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	(N)HXXH	E90		E90				E90		E90		E90		E90	E90	E90
	(N)HXXCH	E90		E90				E90		E90		E90		E90	E90	E90
	JE-H(St)H	E90		E90				E90		E90		E90		E90	E90	E90
	JE-H(St)HRH	E30		E30				E30		E30		E30		E30	E30	E30

EUPEN	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	(N)HXH = (N)HXH-J	E60		E60				E60		E60		E60		E60	E60	E60
	(N)HXCH	E90		E90				E90		E90		E90		E90	E90	E90
	JE-H(st)H	E60		E60				E60		E60		E60		E60	E60	E60
KABLOTEK	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	NHXXH = NHXXH-J	E90		E90				E90		E90		E90		E90	E90	E90
	JE-H(St)H	E90		E90				E90		E90		E90		E90	E90	E90
MADEX	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	NHXXH - NHXXH-J	E90		E90				E90		E90		E90		E90	E90	E90
	NHXCH	E90		E90				E90		E90		E90		E90	E90	E90
	HTKSH	E30		E30				E30		E30		E30		E30	E30	E30
	HTKSHekw	E30		E30				E30		E30		E30		E30	E30	E30
TECHNOKABEL	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	NHXXH E90 = NHXXH-J E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	E90
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	(N)HXHX	E90		E90				E90		E90		E90		E90	E90	E90
	NHXCH E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	(N)HXCH E90	E90	E90	E90		E90	E90	E90	E90	E90		E90		E90	E90	E90
	(N)HXCH-J SERVO E90	E90	E90	E90		E60	E90	E90	E60	E90		E90		E90	E90	E90
	JE-H(St)H E30 - E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	HDGs E30-E90	E90	E90	E90		E30	E90	E90	E30	E90	E90	E90	E90	E90	E90	E90
	HDGs-W E30-E90	E90	E30	E90			E30	E90		E90		E90		E90	E90	E90
	HDGszo-W E30-E90	E90		E90				E90		E90		E90		E90	E90	E90
	HTKSH E30-E90	E90	E90	E90			E90	E90		E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90	E90	E90		E30	E90	E90	E30	E90	E90	E90	E90	E90	E90	E90
	HLGs E30-E90	E90		E90				E90		E90		E90		E90	E90	E90
TELEFONIKA	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	FLAME-X 950 NHXXH E90= NHXXH-J E90	E90		E90		E90		E90	E90	E90		E90		E90	E90	E90
	FLAME-X 950 NHXCH E90	E90		E90		E90		E90	E90	E90		E90		E90	E90	E90
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	N2XH	E90		E90				E90		E90		E90		E90	E90	E90
	JE-H(St)H	E90	E90	E90		E90	E90	E90	E90	E90		E90		E90	E90	E90
	FLAME-X 950 HDGs E30-E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	FLAME-X 950 HTKSH E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90
	FLAME-X 950 HTKSHekw E90	E90	E90	E90			E90	E90		E90		E90		E90	E90	E90

VLG	Cable type	5-12	13-22	30-32	33	34-35	36-42	51-53	54	55	59	60-61	63	64-65	67-68	73
	(N)HXH E90				E90											
	JE-H(St)H E90				E90											

Annex 2 Table 12. **Group D1** cable classification - Special support structures - **DUJ...H60**

BITNER	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	BiTflame 1000 E90	E60	E60	E60	E60	E60	E60	E60	E60
	BiTflame S-M	E90	E90	E90	E90	E90	E90	E90	E90
	BiTflame S-M(St)	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGsekWF E90	E60	E60	E60	E60	E60	E60	E60	E60
	HTKSH E90	E30	E30	E30	E30	E30	E30	E30	E30
TECHNOKABEL	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	(N)HXH E90 = (N)HXH-J E90	E60	E60	E60	E60	E60	E60	E60	E60
	(N)HXCH E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs E30-E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs-W E30-E90	E30	E30	E30	E30	E30	E30	E30	E30
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90	E90	E90	E90	E90	E90	E90	E90
TELEFONIKA	Cable type	5-12	30-32	51-53	55	60-61	64-65	67-68	73
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E60	E60	E60	E60	E60	E60	E60	E60
	FLAME-X 950 (N)HXCH E90	E90	E90	E90	E90	E90	E90	E90	E90

Annex 2 Table 13. **Group D2** cable classification - Special support structures - **DUD...H60**

	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
BITNER	NHXH E90 = NHXH-J E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90		
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90		E90
	NHXCH E90	E90		E90			E90		E90	E90	E90	E90	E90		
	(N)HXCH E90	E90		E90			E90		E90	E90	E90	E90	E90		
	BiTflame 1000 E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90		E90
	BiTflame 1000 C E90	E90		E90			E90		E90	E90	E90	E90	E90		
	BiTservo FS E90	E30	E90	E30		E90	E30		E30	E30	E30	E30	E30		
	HDGs E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90		E90
	HDGsekwf E90		E90			E90									
	HTKSH E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90		E90
	HLGs(žo)	E30		E30			E30		E30	E30	E30	E30	E30		
DÄTWYLER	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	(N)HXH		E30			E30									
	(N)HXCH		E30			E30									
	JE-H(St)H		E30			E30									
ELPAR	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	NHXH = NHXH-J	E30		E30			E30		E30	E30	E30	E30	E30		
	(N)HXH = (N)HXH-J	E90		E90			E90		E90	E90	E90	E90	E90		
	NHXCH	E90		E90			E90		E90	E90	E90	E90	E90		
	(N)HXCH	E90		E90			E90		E90	E90	E90	E90	E90		
	HDGs	E30		E30			E30		E30	E30	E30	E30	E30		
	HTKSH	E30		E30			E30		E30	E30	E30	E30	E30		
TECHNOKABEL	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	NHXH E90 = NHXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	NHXHX E90	E90		E90			E90		E90	E90	E90	E90	E90		
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	NHXCH E90	E90		E90			E90		E90	E90	E90	E90	E90		E90
	NHXCHX	E90		E90			E90		E90	E90	E90	E90	E90		
	(N)HXCH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90		
	(N)HXCH-J SERVO E90	E60	E90	E60		E90	E60		E60	E60	E60	E60	E60		E90
	HDGs E30-E90	E90		E90			E90		E90	E90	E90	E90	E90		E90
	HDGs-W E30-E90	E90		E90	E30		E90	E30	E90	E90	E90	E90	E90	E90	
	HTKSH E30-E90	E90		E90	E60		E90	E60	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90	E90		E90			E90		E90	E90	E90	E90	E90		E90
	HLGs E30-E90	E90		E90			E90		E90	E90	E90	E90	E90		
	HLGs-W	E90		E90			E90		E90	E90	E90	E90	E90		

TELEFONIKA	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	FLAME-X 950 NHXH E90= NHXH-J E90	E60		E60			E60		E60	E60	E60	E60	E60	E90	
	FLAME-X 950 NHXCH E90	E30		E30			E30		E30	E30	E30	E30	E30		
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90	E90	E90
	JE-H(St)H	E90	E30	E90		E30	E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 HDGs E30-E90	E90	E30	E90		E30	E90		E90	E90	E90	E90	E90	E90	
	FLAME-X 950 HTKSH E90	E60		E60			E60		E60	E60	E60	E60	E60		E90
	FLAME-X 950 HTKSHekw E90	E30		E30			E30		E30	E30	E30	E30	E30		
	HLGsekwf	E30		E30			E30		E30	E30	E30	E30	E30		

Annex 2 Table 14. **Group D3** cable classification - Special support structures - **DUD.H45**

BITNER	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73
	(N)HXH E90 = (N)HXH-J E90	E30		E30			E30		E30	E30	E30	E30	E30
	BiTflame 1000 E90	E30		E30			E30		E30	E30	E30	E30	E30
	HTKSH E90	E90		E90			E90		E90	E90	E90	E90	E90
TECHNOKABEL	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73
	NHXH E90 = NHXH-J E90	E90	E90	E90	E60	E90	E90	E60	E90	E90	E90	E90	E90
	(N)HXH E90 = (N)HXH-J E90	E30	E90	E30		E90	E30		E30	E30	E30	E30	E30
	NHXCH E90	E60	E60	E60		E60	E60		E60	E60	E60	E60	E60
	(N)HXCH E90	E90		E90			E90		E90	E90	E90	E90	E90
	(N)HXCH-J SERVO E90		E60			E60							
	HDGs E30-E90	E90		E90			E90		E90	E90	E90	E90	E90
	HDGs-W E30-E90	E90		E90			E90		E90	E90	E90	E90	E90
TELEFONIKA	Cable type	5-12	13-22	30-32	34-35	36-42	51-53	54	55	60-61	64-65	67-68	73
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E90	E90	E90		E90	E90		E90	E90	E90	E90	E90
	FLAME-X 950 HDGs E30-E90		E90			E90							
	FLAME-X 950 HTKSH E90		E90			E90							
	FLAME-X 950 HTKSHekw E90		E90			E90							

Annex 2 Table 15. **Group D4** cable classification - Special support structures - **DGOD...H60**

BITNER	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	NHXXH E90 = NHXXH-J E90	E30			E30				E30		E30	E30	E30	E30	E30		
	(N)HXXH E90 = (N)HXXH-J E90					E90				E90							
	NHXXCH E90	E90			E90				E90		E90	E90	E90	E90	E90		
	BiTflame 1000 E90					E90				E90							
	HDGs E90					E90				E90							
	HTKSH E90					E90				E90							
TECHNOKABEL	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	NHXXH E90 = NHXXH-J E90	E90			E90	E90			E90	E90	E90	E90	E90	E90	E90		
	(N)HXXH E90 = (N)HXXH-J E90	E30	E90		E30	E90	E90		E30	E90	E30	E30	E30	E30	E30		
	NHXXCH E90					E90				E90							
	(N)HXXCH E90	E90			E90				E90		E90	E90	E90	E90	E90		
	(N)HXXCH-J SERVO E90					E90				E90							
	JE-H(St)H E30 - E90	E60			E60	E90			E60	E90	E60	E60	E60	E60	E60		
	HDGs E30-E90		E90			E30	E90			E30							
	HDGs-W E30-E90	E90			E90				E90		E90	E90	E90	E90	E90		
	HTKSH E30-E90	E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90		
	HTKSHekw E30-E90	E90			E90	E90			E90	E90	E90	E90	E90	E90	E90		
TELEFONIKA	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	60-61	64-65	67-68	73	76-78	79-82
	FLAME-X 950 NHXXH E90= NHXXH-J E90					E90				E90							
	FLAME-X 950 NHXXCH E90					E90				E90							
	FLAME-X 950 (N)HXXH E90= (N)HXXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E60	E90
	FLAME-X 950 (N)HXXCH E90	E90	E90	E90	E90	E60	E90	E90	E90	E60	E90	E90	E90	E90	E90	E60	E90
	JE-H(St)H					E90				E90							
	FLAME-X 950 HDGs E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HTKSH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HTKSHekw E90	E90	E90	E60	E90	E90	E90	E60	E90	E90	E90	E90	E90	E90	E90	E60	E90

Annex 2 Table 16. **Group D5** cable classification - Special support structures - **DUP/DUOP...H60**

	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
BITNER	NHXXH E90 = NHXXH-J E90	E30	E90		E30		E90				E30	E30		E30		E30	E30	E30		
	(N)HXH E90 = (N)HXH-J E90	E90	E60	E30	E90		E60				E90	E90		E90		E90	E90	E90	E30	E90
	NHXCH E90	E90			E90		E90				E90	E90		E90		E90	E90	E90		
	(N)HXCH E90	E90		E30	E90	E30					E90	E90		E90		E90	E90	E90	E30	E30
	BiTflame 1000 E90	E90	E60	E60	E90		E60				E90	E90		E90		E90	E90	E90	E60	E90
	BiTflame 1000 C E90	E30	E60	E60	E30		E60				E30	E30		E30		E30	E30	E30	E90	E90
	BiTflame FS	E30			E30						E30	E30		E30		E30	E30	E30		
	HDGs E90	E90	E90	E30	E90	E30	E90				E90	E90		E90		E90	E90	E90	E60	E90
	HDGsekwf E90	E30	E90	E90	E30		E90				E30	E30		E30		E30	E30	E30	E90	
	HTKSH E90	E90	E90	E90	E90		E90				E90	E90		E90		E90	E90	E90	E90	E90
	HTKSHekw E90	E90	E90	E90	E90		E90				E90	E90		E90		E90	E90	E90	E90	
DÄTWYLER	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	(N)HXH		E60				E60													
	(N)HXCH		E90				E90													
	JE-H(St)H		E30				E30													
ELPAR	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	NHXXH = NHXXH-J	E90			E90						E90	E90		E90		E90	E90	E90		
	(N)HXH = (N)HXH-J	E60			E60						E60	E60		E60		E60	E60	E60		
	NHXCH	E90			E90						E90	E90		E90		E90	E90	E90		
	(N)HXCH	E90			E90						E90	E90		E90		E90	E90	E90		
	HDGs	E90			E90						E90	E90		E90		E90	E90	E90		
	HTKSH	E30			E30						E30	E30		E30		E30	E30	E30		
STUDER	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	(N)HXH = (N)HXH-J	E60	E30		E60		E30				E60	E60		E60		E60	E60	E60		
	(N)HXCH	E90	E60		E90		E60				E90	E90		E90		E90	E90	E90		
	JE-H(St)H	E30			E30						E30	E30		E30		E30	E30	E30		
	JE-H(St)HRH	E90			E90						E90	E90		E90		E90	E90	E90		
TECHNOKABEL	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	NHXXH E90 = NHXXH-J E90	E90	E90	E90	E90		E90	E60	E60	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90		E90	E90	E90	E90	E90	E90		E90		E90	E90	E90	E30	E90
	NHXCH E90	E90		E90	E90					E90	E90	E90		E90		E90	E90	E90	E90	E90
	(N)HXCH E90			E90						E90										E90
	(N)HXCH-J SERVO E90	E60			E60						E60	E60		E60		E60	E60	E60		E90
	NHXHRHX E90 = NHXHRHX-J E90	E90			E90						E90	E90		E90		E90	E90	E90		
	HDGs E30-E90	E90		E60	E90				E90	E60	E90	E90		E90		E90	E90	E90	E30	E90
	HDGs-W E30-E90			E90						E90										E90
	HDGsžo E30-E90																			E90

	HDGszo-W E30-E90	E60			E60						E60	E60		E60		E60	E60	E60		
	HDGsekw E30-E90			E30						E30										
	HDGsekwzo E30-E90	E90			E90						E90	E90		E90		E90	E90	E90		
	HTKSH E30-E90	E90		E90	E90				E90	E60	E90	E90	E90		E90		E90	E90	E90	E90
	HTKSHekw E30-E90	E90		E90	E90						E90	E90	E90		E90		E90	E90	E90	E90
TELEFONIKA	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	FLAME-X 950 NHXH E90= NHXH-J E90	E90	E90		E90		E90				E90	E90		E90		E90	E90	E90		E90
	FLAME-X 950 NHXCH E90	E90			E90						E90	E90		E90		E90	E90	E90		
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90	E90	E30	E90		E90			E30	E90	E90		E90		E90	E90	E90	E30	E90
	FLAME-X 950 (N)HXCH E90	E90	E60	E60	E90		E60			E60	E90	E90		E90		E90	E90	E90	E30	E90
	JE-H(St)H	E90	E30	E90	E90		E30			E90	E90	E90		E90		E90	E90	E90		
	FLAME-X 950 HDGs E30-E90	E90		E30	E90					E30	E90	E90		E90		E90	E90	E90		E90
	FLAME-X 950 HTKSH E90	E90		E60	E90					E60	E90	E90		E90		E90	E90	E90		E90
	FLAME-X 950 HTKSHekw E90																			E90
	HLGsekwf			E30						E30										
VLG	Cable type	5-12	13-22	27	30-32	33	36-42	43	44	45	51-53	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	(N)HXH E90					E60														
	JE-H(St)H E90					E60														

Annex 2 Table 17. **Group D6** cable classification - Special support structures - **DGOP...H60**

BITNER	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	NHXH E90 = NHXH-J E90	E90			E90				E90		E90		E90		E90	E90	E90		
	NHXCH E90	E30			E30				E30		E30		E30		E30	E30	E30		
	BiTflame 1000 E90	E90			E90				E90		E90		E90		E90	E90	E90		
	BiTflame 1000 C E90	E90			E90				E90		E90		E90		E90	E90	E90		
	HDGs E90	E90			E90				E90		E90		E90		E90	E90	E90		
	HDGsekwf E90	E30			E30				E30		E30		E30		E30	E30	E30		
	HTKSHekw E90	E60			E60				E60		E60		E60		E60	E60	E60		
DÄTWYLER	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	(N)HXH	E90			E90				E90		E90		E90		E90	E90	E90		
	JE-H(St)H	E60			E60				E60		E60		E60		E60	E60	E60		
	JE-H(St)HRH	E90			E90				E90		E90		E90		E90	E90	E90		

	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
		E90			E90				E90		E90		E90		E90	E90	E90		
ELKOND	NHXH = NHXH-J (1.5-10mm ²)	E90			E90				E90		E90		E90		E90	E90	E90		
	N2XH P30	E90			E90				E90		E90		E90		E90	E90	E90		
	N2XH P60	E60			E60				E60		E60		E60		E60	E60	E60		
	JE-H(st)H P30	E30			E30				E30		E30		E30		E30	E30	E30		
	JE-H(st)H P90	E90			E90				E90		E90		E90		E90	E90	E90		
	1-CXKH-V (1.5-10mm ²)	E90			E90				E90		E90		E90		E90	E90	E90		
EUPEN	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	(N)HXH = (N)HXH-J	E90			E90				E90		E90		E90		E90	E90	E90		
	(N)HXCH	E90			E90				E90		E90		E90		E90	E90	E90		
	JE-H(st)H	E90			E90				E90		E90		E90		E90	E90	E90		
TECHNOKABEL	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	NHXH E90 = NHXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90		
	(N)HXH E90 = (N)HXH-J E90	E90	E30		E90	E90	E30		E90	E90	E90		E90		E90	E90	E90		
	(N)HXHX	E90			E90				E90		E90		E90		E90	E90	E90		
	NHXCH E90	E90	E90	E90	E90		E90	E90	E90		E90		E90		E90	E90	E90		E90
	(N)HXCH E90	E90			E90				E90		E90		E90		E90	E90	E90		
	JE-H(St)H E30 - E90	E90			E90				E90		E90		E90		E90	E90	E90		
	HDGs E30-E90	E90	E90		E90		E90		E90		E90	E90	E90	E90	E90	E90	E90		
	HDGs-W E30-E90					E90				E90									
	HDGszo E30-E90			E90				E90											
	HDGsekwzo E30-E90																		E90
	HTKSH E30-E90	E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90		
	HTKSHekw E30-E90	E90			E90				E90		E90	E90	E90	E90	E90	E90	E90		E90
	HLGs E30-E90	E30			E30				E30		E30		E30		E30	E30	E30		
TELEFONIKA	Cable type	5-12	13-22	27	30-32	34-35	36-42	45	51-53	54	55	59	60-61	63	64-65	67-68	73	76-78	79-82
	FLAME-X 950 NHXH E90= NHXH-J E90	E90	E90		E90		E90		E90		E90		E90		E90	E90	E90		
	FLAME-X 950 NHXCH E90		E60				E60												
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90			E90				E90		E90		E90		E90	E90	E90	E90	
	FLAME-X 950 (N)HXCH E90	E90			E90				E90		E90		E90		E90	E90	E90	E90	
	N2XH	E90			E90				E90		E90		E90		E90	E90	E90		
	JE-H(St)H	E90	E90		E90		E90		E90		E90		E90		E90	E90	E90	E90	
	FLAME-X 950 HDGs E30-E90	E90	E90		E90		E90		E90		E90		E90		E90	E90	E90		
	FLAME-X 950 HTKSH E90	E90			E90				E90		E90		E90		E90	E90	E90	E90	
	FLAME-X 950 HTKSHekw E90	E90	E90		E90		E90		E90		E90		E90		E90	E90	E90		

Annex 2 Table 18. **Group D7** cable classification - Special support structures - **DFP...H60**

		Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		(N)HXH E90 = (N)HXH-J E90	E60	E90	E60	E90	E60	E60	E60	E60	E60	E60
BITNER		BiTflame 1000 E90	E60		E60		E60	E60	E60	E60	E60	E60
		BiTflame 1000 C E90	E90		E90		E90	E90	E90	E90	E90	E90
		BiTservo FS E90	E90		E90		E90	E90	E90	E90	E90	E90
		HDGs E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
		HTKSH E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	DÄTW YLER	Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		(N)HXCH	E90		E90		E90	E90	E90	E90	E90	E90
ERSE		Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		(N)HXH	E90		E90		E90	E90	E90	E90	E90	E90
		(N)HXCH	E90		E90		E90	E90	E90	E90	E90	E90
		JE-H(st)H	E90		E90		E90	E90	E90	E90	E90	E90
TECHNOKABEL		Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		NHXH E90 = NHXH-J E90	E90	E60	E90	E60	E90	E90	E90	E90	E90	E90
		(N)HXH E90 = (N)HXH-J E90	E90	E30	E90	E30	E90	E90	E90	E90	E90	E90
		NHXCH E90		E90		E90						
		(N)HXCH E90	E60		E60		E60	E60	E60	E60	E60	E60
		(N)HXCH-J SERVO E90	E30	E60	E30	E60	E30	E30	E30	E30	E30	E30
		HDGs E30-E90		E90		E90						
		HDGszo-W E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
		HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
		HLGs E30-E90	E90		E90		E90	E90	E90	E90	E90	E90
		HLGsekw E30-E90	E60		E60		E60	E60	E60	E60	E60	E60
TELEFONIKA		Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E30		E30		E30	E30	E30	E30	E30	E30
		FLAME-X 950 (N)HXCH E90	E30		E30		E30	E30	E30	E30	E30	E30
		JE-H(St)H	E30	E30	E30	E30	E30	E30	E30	E30	E30	E30
VLG		Cable type	5-12	13-22	30-32	36-42	51-53	55	60-61	64-65	67-68	73
		(N)HXH E90	E90		E90		E90	E90	E90	E90	E90	E90
		(N)HXH E30	E90		E90		E90	E90	E90	E90	E90	E90
		JE-H(St)H E90	E30		E30		E30	E30	E30	E30	E30	E30
		JE-H(St)H E30	E60		E60		E60	E60	E60	E60	E60	E60

Annex 2 Table 19. **Group D8** cable classification - Special support structures - **DUVC...H60**

TECHNOKABEL	Cable type		87
	(N)HXH E90 = (N)HXH-J E90		E90
	(N)HXCH E90		E90
TELEFONIKA	Cable type		87
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90		E90
	FLAME-X 950 (N)HXCH E90		E60
	FLAME-X 950 HDGs E30-E90		E90
	FLAME-X 950 HTKSH E90		E90

Annex 2 Table 20. **Group S1** cable classification - Special support structures - **KGS...H60**

TECHNOKABEL	Cable type		24
	NHXXH E90 = NHXXH-J E90		E90
	(N)HXH E90 = (N)HXH-J E90		E30
	HDGs E30-E90		E90
	HTKSH E30-E90		E90
	HTKSHekw E30-E90		E90

Annex 2 Table 21. **Group S2** cable classification - Special support structures - **KDS/KDSO...H60, KSG...H60**

BITNER	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXXH E90 = NHXXH-J E90	E90	E90	E90			E90		E90	E90			E90						E90		E90	E90	E90		E90		E90		E90	E90					
	(N)HXH E90 = (N)HXH-J E90		E90	E60		E90	E90			E90			E60						E90		E90		E90		E90		E90		E90					E90	E90
	NHXCH E90		E90	E90			E90			E90			E90						E90		E90		E90		E90		E90		E90						
	(N)HXCH E90		E90				E90			E90									E90		E90		E90		E90		E90		E90						
	BiTflame 1000 E90	E90	E90		E90	E90	E90		E90	E90	E90			E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90		E90	E90
	BiTflame 1000 C E90		E90		E90	E90	E90			E90					E90		E90		E90		E90		E90		E90	E90	E90			E90	E90			E90	E90
	BiTflame AS(St) E90		E90				E90			E90									E90		E90		E90		E90		E90		E90						
	HDGs E90	E90	E90	E30	E90	E90	E90		E90	E90	E90		E30	E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90		E90	E90
	HDGsekwf E90	E90	E90		E30		E90		E90	E90					E30		E30		E90		E90	E90	E90	E90	E90	E30	E90	E90	E90	E90	E30	E90			
	HTKSH E90	E90	E90	E90	E90		E90		E90	E90	E90		E90	E90	E90		E90	E90	E90		E90	E90	E90	E30	E90	E90	E90	E30	E90	E90	E90	E30			E90
	HTKSHekw E90		E90		E90	E90	E90			E90				E30	E90		E90	E30	E90		E90		E90	E30	E90	E90	E90	E30		E90	E90	E30		E90	

DÄTWYLER	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	(N)HXH		E90	E90			E90			E90			E90						E90		E90		E90		E90		E90			E90					
	(N)HXCH		E90	E90			E90			E90			E90						E90		E90		E90		E90		E90			E90					
	JE-H(St)H		E60	E30	E60		E60			E60			E30		E60		E60		E60		E60		E60		E60	E60	E60			E60	E60				
	JE-H(St)HRH		E30		E60		E30			E30					E60		E60		E30		E30		E30		E30	E60	E30			E30	E60				
ELOKND	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH = NHXH-J (1.5-10mm²)		E60		E90		E60			E60					E90		E90		E60		E60		E60		E60	E90	E60			E60	E90				
	N2XH P30		E60		E90		E60			E60					E90		E90		E60		E60		E60		E60	E90	E60			E60	E90				
	N2XH P60		E60		E90		E60			E60					E90		E90		E60		E60		E60		E60	E90	E60			E60	E90				
	JE-H(st)H P30		E30		E60		E30			E30					E60		E60		E30		E30		E30		E30	E60	E30			E30	E60				
	JE-H(st)H P90		E30	E30	E90		E30			E30			E30		E90		E90		E30		E30		E30		E30	E90	E30			E30	E90				
	1-CXKH-V (1.5-10mm²)	E90	E90	E90	E90		E90		E90	E90			E90		E90		E90		E90		E90	E90	E90		E90	E90	E90		E90	E90	E90				
	SSKFH-V180	E30			E30				E30						E30		E30					E30				E30			E30		E30				
	SHXKFH-V180	E90	E90	E90			E90		E90	E90			E90						E90		E90	E90	E90		E90		E90		E90	E90					
ELPAR	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH = NHXH-J		E30				E30			E30									E30		E30		E30		E30		E30			E30					
	(N)HXH = (N)HXH-J		E60				E60			E60									E60		E60		E60		E60		E60			E60					
	NHXCH		E60				E60			E60									E60		E60		E60		E60		E60			E60					
	(N)HXCH		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	HDGs		E30				E30			E30									E30		E30		E30		E30		E30			E30					
	HTKSH		E30				E30			E30									E30		E30		E30		E30		E30			E30					
ERSE	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	(N)HXH = (N)HXH-J		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	(N)HXCH		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	JE-H(st)H		E90				E90			E90									E90		E90		E90		E90		E90			E90					
KABLOTEK	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH = NHXH-J		E60				E60			E60									E60		E60		E60		E60		E60			E60					
	NHXCH		E90				E90			E90									E90		E90		E90		E90		E90			E90					
MADEX	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH - NHXH-J		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	NHXCH		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	HTKSH		E30		E60		E30			E30					E60		E60		E30		E30		E30		E30	E60	E30			E30	E60				
	HTKSHekw				E30										E30		E30									E30					E30				
NKT	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH = NHXH-J		E90				E90			E90									E90		E90		E90		E90		E90			E90					

PRAKAB	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	(N)HXH		E30	E60			E30			E30			E60						E30		E30		E30		E30		E30		E30						
	SSKFH-V180		E60	E30			E60			E60			E30						E60		E60		E60		E60		E60			E60					
TECHNOKABEL	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	NHXH E90 = NHXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90			E90	E90	E90	E90	E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	
	NHXHX E90		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E30	E90	E90	E90	E90	E90	E90		E90	E30	E90	E90	E90	E90	E90	E90	E90	E90	E90	E30	E90	E90	E90	E30	E90	E90	E90	E30	E30	E90	E90	
	NHXCH E90	E30	E90	E90	E90	E90	E90		E30	E90			E90		E90		E90		E90		E90	E30	E90		E90	E90	E90		E30	E90	E90			E90	
	(N)HXCH E90		E90	E90	E90	E90	E90			E90			E90		E90		E90		E90		E90		E90		E90	E90	E90			E90	E90			E90	
	(N)HXCH-J SERVO E90	E90	E60	E60	E90		E60		E90	E60		E90	E60		E90		E90		E60	E90	E60	E90	E60		E60	E90	E60		E90	E60	E90				
	JE-H(St)H E30 - E90				E60										E60		E60									E60					E60				
	HDGs E30-E90	E90	E90	E30	E90		E90	E90	E90	E90		E90	E30	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90			E90
	HDGs-W E30-E90	E90	E90		E90		E90		E90	E90		E90			E90		E90		E90		E90	E90	E90		E90	E90	E90		E90	E90	E90		E90		
	HDGszo-W E30-E90		E60				E60			E60									E60		E60		E60		E60		E60			E60					
	HDGsekw E30-E90			E30	E90							E90	E30		E90		E90				E90						E90				E90				E90
	HDGsekw-W	E90				E90			E90													E90							E90						E90
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E60	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90		E90		E60	E90	E90			E90		E90		E90	E60		E60	E90	E90	E90	E90		E90	E90	E90	E60	E90	E90		E90	E60	E90		E90	E90
HLGs-W	E30				E90			E30													E30							E30						E90	
TELEFONIKA	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	FLAME-X 950 NHXH E90= NHXH-J E90		E90			E90	E90			E90									E90		E90		E90		E90		E90			E90			E60	E90	
	FLAME-X 950 NHXCH E90		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90		E90	E90	E90	E90	E90			E90			E90		E90		E90		E90		E90		E90		E90	E90	E90			E90	E90		E90	E90	E90
	FLAME-X 950 (N)HXCH E90	E60	E90	E30		E90	E90		E60	E90			E30						E90		E90	E60	E90		E90		E90		E60	E90			E90	E90	
	JE-H(St)H	E60	E90				E90		E60	E90									E90		E90	E60	E90		E90		E90		E60	E90			E90		
	FLAME-X 950 HDGs E30-E90	E60	E90		E90	E90	E90		E60	E90					E90		E90		E90		E90	E60	E90		E90	E90	E90		E60	E90	E90		E90	E90	E90
	FLAME-X 950 HTKSH E90		E90		E90	E90	E90			E90					E90		E90		E90		E90		E90		E90	E90	E90			E90	E90		E60	E90	E90
FLAME-X 950 HTKSHekw E90					E30																												E30		
VLG	Cable type	1	5-12	13-22	23	25	26	28	29	30-32	33	34-35	36-42	46	47	48	49	50	51-53	54	55	57	60-61	62	64-65	66	67-68	69	71	73	74	75	76-78	83	84-85
	(N)HXH E90		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	(N)HXH E30		E60				E60			E60									E60		E60		E60		E60		E60			E60					
	JE-H(St)H E90		E90				E90			E90									E90		E90		E90		E90		E90			E90					
	JE-H(St)H E30		E60				E60			E60									E60		E60		E60		E60		E60			E60					

Annex 2 Table 22. **Group S3** cable classification - Special support structures - **KDSZ.H60**

BITNER	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	(N)HXH E90 = (N)HXH-J E90	E30		E90	E30	E30		E90	E30	E30	E30	E30	E90	E30	E30	E90
	(N)HXCH E90	E60			E60	E60			E60	E60	E60	E60		E60	E60	
	BiTflame 1000 E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90
	BiTflame 1000 C E90	E90			E90	E90			E90	E90	E90	E90		E90	E90	
	BiTservo FS E90	E30			E30	E30			E30	E30	E30	E30		E30	E30	
	HDGs E90	E30		E90	E30	E30		E90	E30	E30	E30	E30	E90	E30	E30	E90
	HDGsekwf E90			E90				E90					E90			E90
	HTKSH E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90
	HLGs(zo)	E90			E90	E90			E90	E90	E90	E90		E90	E90	
DÄTWYLER	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	(N)HXH	E30			E30	E30			E30	E30	E30	E30		E30	E30	
	(N)HXCH	E60			E60	E60			E60	E60	E60	E60		E60	E60	
ELKOND	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	NHXH = NHXH-J		E90				E90									
	1-CXKH-V		E90				E90									
	SSKFH-V180 P60		E30				E30									
	SHKFH-V180		E90				E90									
ERSE	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	(N)HXH = (N)HXH-J	E90			E90	E90			E90	E90	E90	E90		E90	E90	
	(N)HXCH	E90			E90	E90			E90	E90	E90	E90		E90	E90	
	JE-H(st)H	E90			E90	E90			E90	E90	E90	E90		E90	E90	
TECHNOKABEL	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	NHXH E90 = NHXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	(N)HXH E90 = (N)HXH-J E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	(N)HXCH E90	E30			E30	E30			E30	E30	E30	E30		E30	E30	
	(N)HXCH-J SERVO E90	E30		E90	E30	E30		E90	E30	E30	E30	E30	E90	E30	E30	E90
	JE-H(St)H E30 - E90		E90				E90									
	HDGs E30-E90	E90	E30	E90	E90	E90	E30	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGs-W E30-E90	E90		E90	E90	E90		E90	E90	E90	E90	E90	E90	E90	E90	E90
	HDGszo-W E30-E90	E90			E90	E90			E90	E90	E90	E90		E90	E90	
	HDGsekW-W			E60				E60					E60			E60
	HTKSH E30-E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90	E90
	HTKSHekw E30-E90		E90	E90			E90	E90					E90			E90

TELEFONIKA	Cable type	5-12	13-22	23	26	30-32	36-42	47	51-53	55	60-61	64-65	66	67-68	73	74
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E60	E90		E60	E60	E90		E60	E60	E60	E60		E60	E60	
	FLAME-X 950 (N)HXCH E90	E60	E30	E60	E60	E60	E30	E60	E60	E60	E60	E60	E60	E60	E60	E60
	JE-H(St)H	E90	E30		E90	E90	E30		E90	E90	E90	E90		E90	E90	
	FLAME-X 950 HDGs E30-E90	E90	E30	E90	E90	E90	E30	E90	E90	E90	E90	E90	E90	E90	E90	E90
	FLAME-X 950 HTKSH E90	E90		E30	E90	E90		E30	E90	E90	E90	E90	E30	E90	E90	E30
	FLAME-X 950 HTKSHekw E90	E30			E30	E30			E30	E30	E30	E30		E30	E30	

Annex 2 Table 23. **Group U** cable classification - Special fixture for cable **clamps and brackets**

BITNER	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	NHXH E90 = NHXH-J E90	E90		E90	E90		E90			
	(N)HXH E90 = (N)HXH-J E90			E90					E60	
	NHXCH E90	E90		E90	E90		E90			
	(N)HXCH E90			E90						
	BiTflame 1000 E90	E90		E90	E90		E90			
	BiTflame 1000 C E90	E90		E90	E60		E90			
	BiTflame S E90				E90					
	BiTflame S(St) E90				E90					
	BiTflame S-M E90				E90					
	BiTflame S-M(St) E90				E90					
	BiTflame AS E90						E90			
	BiTservo FS E90	E90		E60						
	HDGs E90	E90		E90	E90		E90		E30	
	HDGsekwf E90			E90	E90		E30			
	HTKSH E90			E90	E90		E90			
	HTKSHekw E90	E90		E90			E90			
DÄTWYLER	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	(N)HXH	E60	E90	E60	E30	E90	E90	E30	E60	
	(N)HXCH	E60	E60		E90	E60	E90	E30	E60	
	JE-H(St)H	E30	E30		E30	E30		E30		

	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
ELKOND	NHXXH = NHXXH-J (1.5-10mm ²)			E90						
	N2XH P30			E60						
	N2XH P60			E60						
	JE-H(st)H P30			E30						
	JE-H(st)H P90			E90						
	1-CXKH-V (1.5-10mm ²)			E90			E90			
	SHXKFH-V180			E90			E90			
	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
ELPAR	NHXXH = NHXXH-J	E90		E60						
	(N)HXXH = (N)HXXH-J	E60		E90						
	NHXXCH	E90		E90						
	(N)HXXCH	E30		E90						
	HDGs	E60		E90						
	HTKSH	E90		E60						
	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
EUPEN	(N)HXXH = (N)HXXH-J	E90	E90			E90		E60		
	(N)HXXCH	E90	E60			E90		E90		
	JE-H(st)H	E90	E90			E90		E60		
	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
ERSE	NHXXH = NHXXH-J					E90		E90		
	(N)HXXH = (N)HXXH-J	E90	E90			E90	E90	E90		
	NHXXCH					E90				
	(N)HXXCH	E90	E90			E90	E90	E90		
	JE-H(st)H	E90	E90			E90	E90	E90		
	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
KABLOTEK	NHXXH = NHXXH-J	E90			E90					
	NHXXCH	E90			E90					
	JE-H(St)H	E90			E90					
	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
MADEX	NHXXH - NHXXH-J	E60		E90						
	NHXXCH			E90						
	HTKSH	E90		E90						
	HTKSHekw			E90						

NKT	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	NHXXH = NHXXH-J	E90		E90	E90		E90			
PRAKAB	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	(N)HXXH			E90			E30			
	SSKFH-V180			E90			E90			
STUDER	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	(N)HXXH = (N)HXXH-J	E90								
	(N)HXXCH	E90					E90			
	(N)HXXCH E30	E30					E60			
	JE-H(St)H						E60			
	JE-H(St)HRH						E30			
TECHNOKABEL	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	NHXXH E90 = NHXXH-J E90	E90		E90	E90		E90		E90	
	(N)HXXH E90 = (N)HXXH-J E90	E90		E90	E90		E90		E90	E90
	NHXXCH E90	E90		E90			E90		E90	
	(N)HXXCH E90	E90		E90					E90	
	(N)HXXCH-J SERVO E90			E90	E90		E90			
	NHXXHRHX E90 = NHXXHRHX-J E90			E90						
	JE-H(St)H E30-E90	E90		E90			E90			
	HDGs E30-E90			E90	E90		E90		E90	E90
	HDGs-W E30-E90			E90			E90			
	HDGszo E30-E90	E90		E90						
	HDGszo-W E30-E90			E90			E90			
	HDGsekwzo E30-E90	E90		E90						
	HTKSH E30-E90	E90		E90	E90		E90		E90	E90
	HTKSHekw E30-E90			E90	E90		E90		E90	
TELEFONIKA	Cable type	U1	U2	U3	U4	U5	U6	U7	U8	U9
	FLAME-X 950 NHXXH E90= NHXXH-J E90	E90		E90	E90		E90			
	FLAME-X 950 NHXXCH E90	E90		E90	E60		E60			
	FLAME-X 950 (N)HXXH E90= (N)HXXH-J E90	E90	E90	E90	E90	E60	E90	E30	R90	
	FLAME-X 950 (N)HXXCH E90	E90	E60	E90	E90	E90	E90	E90		
	JE-H(St)H	E90	E90	E90	E90	E90	E90	E30	R60	

	FLAME-X 950 HDGs E30-E90	E90		E90	E90		E90		R90	
	FLAME-X 950 HTKSH E90	E90		E90	E90		E90			
	FLAME-X 950 HTKSHekw E90	E60		E90	E90		E90			
	HLGsekwf						E30			

Annex 2 Table 24. **Group N** cable classification - Special support structures - **KS...H68**

BITNER	Cable type	N
	(N)HXH E90 = (N)HXH-J E90	E90
	BiTflame S E90	E90
	BiTflame AS E90	E90
	HDGs E90	E90
	HTKSH E90	E90
TECHNOKABEL	Cable type	N
	NHXXH E90 = NHXXH-J E90	E90
	HDGs E30-E90	E90
	HTKSH E30-E90	E90
	HTKSHekw E30-E90	E90
TELEFONIKA	Cable type	N
	FLAME-X 950 (N)HXH E90= (N)HXH-J E90	E90
	FLAME-X 950 (N)HXCH E90	E60
	JE-H(St)H	E60
	FLAME-X 950 HTKSH E90	E90
	HLGsekwf	E60

Annex 3 Special support structures - 120 min, fibre optic cables

Since the DIN 4102- 4102: 1998 standard does not provide for an E120 classification, the 1- 19 gives the result of the test in the form of the achieved time for circuit integrity maintenance under fire conditions.

Annex 3 Table 1

KCP/KCOP...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	36	100-400	10 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	NHXXCH E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-028-18-NURE
	5	100-400	10 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	(N)HXXCH E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	(N)HXXH	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-028-18-NURE
	9	100-400	10 kg/m	1.5 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		100-400	10 kg/m	1.5 m	HLGs E30-E90	120 min	FIRES-JR-028-18-NURE
		100-600	25 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-047-16-NURE
		100-600	25 kg/m	1.5 m	(N)HXXCH E90	120 min	FIRES-JR-047-16-NURE
	30	100-300	10 kg/m	1.2 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-300	10 kg/m	1.2 m	Je-H(St)H	120 min	FIRES-JR-119-18-NURE
	7	100-300	10 kg/m	1.2 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-119-18-NURE
PRAKAB	7	100-300	10 kg/m	1.2 m	PRAFlaDur 1-CSKH-V180	120 min	FIRES-JR-085-15-NURS
BITNER	11	100-300	10 kg/m	1.2 m	HDGs E90	120 min	FIRES-JR-123-22-NURE

Annex 3 Table 2

KFL...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	20	100-300	10 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-047-16-NURE
	71	50	5 kg/m	1.5 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-047-16-NURE
	1	50	2 kg/m	1.5 m	NHXXH E90	120 min	FIRES-JR-088-18-NURE
	30	100-300	20 kg/m	1.5 m	HLGs E30-E90	120 min	FIRES-JR-088-18-NURE
BITNER	9	100-300	20 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-039-22-NURE
	61	100-300	10 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-039-22-NURE
	38	100-300	10 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-039-22-NURE
		100-300	10 kg/m	1.5 m	HDGs E90	120 min	FIRES-JR-039-22-NURE

Annex 3 Table 3

KLFL...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	2	75	5 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-088-18-NURE
		75	5 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-088-18-NURE
		75	5 kg/m	1.5 m	HDGs E30-E90	120 min	FIRES-JR-088-18-NURE

Annex 3 Table 4

KGL/KGOL...H60, KCL/KCLO...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TELEFONIKA	34	100-300	20 kg/m	1.5 m	FLAME-X 950 HDGs E30-E90	120 min	FIRES-JR-074-18-NURE
BITNER	56	50	5 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-039-22-NURE
	3	50	5 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-039-22-NURE
		50	5 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-039-22-NURE
		50	5 kg/m	1.5 m	HDGs E90	120 min	FIRES-JR-039-22-NURE

Annex 3 Table 5

KFJ...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	9	100-400	20 kg/m	1.5 m	JE-H(St)H E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.5 m	HLGs E30-E90	120 min	FIRES-JR-119-18-NURE

Annex 3 Table 6

Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	86	100-400	20 kg/m	1.5 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.5 m	HDGs-W E30-E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-119-18-NURE
BITNER	1	100-150	7 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-123-22-NURE

Annex 3 Table 7

KBJ...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	9	100-400	20 kg/m	1.2 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-088-18-NURE
BITNER		100-400	10 kg/m	1.5 m	BiTflame 1000 E90	120 min	FIRES-JR-039-22-NURE
		100-400	20 kg/m	1.5 m	BiTflame S-M E90	120 min	FIRES-JR-123-22-NURE

Annex 3 Table 8

DUJ...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
BITNER	9	100-400	10 kg/m	1.5 m	HDGs E90	120 min	FIRES-JR-123-22-NURE
		100-400	10 kg/m	1.5 m	BiTflame S-M(St) E90	120 min	FIRES-JR-123-22-NURE
		100-400	10 kg/m	1.5 m	BiTflame S-M E90	120 min	FIRES-JR-123-22-NURE
		100-400	10 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		100-400	10 kg/m	1.5 m	BiTflame AS E90	120 min	FIRES-JR-126-22-NURE2
		100-400	10 kg/m	1.5 m	BiTflame AS(St) E90	120 min	FIRES-JR-126-22-NURE2

Annex 3 Table 9

DGOD...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TELEFONIKA	34	100-400	20 kg/m	1.5 m	FLAME-X 950 NHXCH E90	120 min	FIRES-JR-074-18-NURE

Annex 3 Table 10

DUD...HJ60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	9	100-400	25 kg/m	1.5 m	(N)HXCH E90	120 min	FIRES-JR-119-18-NURE
		100-400	25 kg/m	1.5 m	HDGs-W E30-E90	120 min	FIRES-JR-119-18-NURE
		100-400	25 kg/m	1.5 m	HLGs-W	120 min	FIRES-JR-119-18-NURE
		100-400	25 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-119-18-NURE

Annex 3 Table 11

DGOP...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	36	100-400	20 kg/m	1.5 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	NHXCH E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-028-18-NURE
	4	100-400	20 kg/m	1.5 m	(N)HXHX	120 min	FIRES-JR-028-18-NURE
	6	100-400	20 kg/m	1.5 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-028-18-NURE
	31	100-400	20 kg/m	1.2 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	(N)HXCH E90	120 min	FIRES-JR-119-18-NURE
	7	100-400	20 kg/m	1.2 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	(N)HXCH E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	JE-H(St)H E90	120 min	FIRES-JR-119-18-NURE
		100-400	20 kg/m	1.2 m	HTKSH E30-E90	120 min	FIRES-JR-119-18-NURE
PRAKAB	7	100-400	20 kg/m	1.2 m	PRAFlaDur 1-CSKH-V180	120 min	FIRES-JR-085-15-NURS

Annex 3 Table 12

DUP/DUOP...H60, DUP...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TELEFONIKA	30	100-600	30 kg/m	1.5 m	FLAME-X 950 NHXH E90= NHXH-J E90	120 min	FIRES-JR-074-18-NURE
	9	100-600	30 kg/m	1.5 m	FLAME-X 950 NHXH E90= NHXH-J E90	120 min	FIRES-JR-074-18-NURE

Annex 3 Table 13

DFP...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	31	100-400	20 kg/m	1.5 m	HLGs E30-E90	120 min	FIRES-JR-088-18-NURE
		100-400	20 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-088-18-NURE

Annex 3 Table 14

KDS/KDSO...H60, KSG...H60							
Cable manufacturer	Structure number from Annex 2	width range	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	5	100-400	20 kg/m	1.5 m	NHXCH E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	(N)HXCH E90	120 min	FIRES-JR-028-18-NURE
		100-400	20 kg/m	1.5 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
	28	100-300	10 kg/m	1.2 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-088-18-NURE
		100-300	10 kg/m	1.2 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-088-18-NURE
		100-300	10 kg/m	1.2 m	HTKSH E30-E90	120 min	FIRES-JR-088-18-NURE
		100-300	10 kg/m	1.2 m	HDGs E30-E90	120 min	FIRES-JR-088-18-NURE
	29	200-600	20 kg/m	1.2 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-088-18-NURE
		200-600	20 kg/m	1.2 m	HDGs-W E30-E90	120 min	FIRES-JR-088-18-NURE
		200-600	20 kg/m	1.2 m	HTKSH E30-E90	120 min	FIRES-JR-088-18-NURE
	83	100-600	20 kg/m	1.5 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	NHXCH E90	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	(N)HXCH E90	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	HLGs-W	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	HTKSH E30-E90	120 min	FIRES-JR-088-18-NURE
		100-600	20 kg/m	1.5 m	HTKSHekw E30-E90	120 min	FIRES-JR-088-18-NURE
	25	100	3 kg/m	1.2 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-088-18-NURE
BITNER	49	60	2 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-123-22-NURE
		60	2 kg/m	1.5 m	HTKSHekw E90	120 min	FIRES-JR-123-22-NURE
	50	100	5 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-123-22-NURE
		100	5 kg/m	1.5 m	HTKSHekw E90	120 min	FIRES-JR-126-22-NURE2
		200-300	10 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		200-300	10 kg/m	1.5 m	HTKSHekw E90	120 min	FIRES-JR-126-22-NURE2
		400-600	15 kg/m	1.5 m	HDGs E90	120 min	FIRES-JR-123-22-NURE

	46	400-600	15 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		100-600	15 kg/m	1.5 m	HDGs E90	120 min	FIRES-JR-123-22-NURE
		100-600	15 kg/m	1.5 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		100-600	15 kg/m	1.5 m	HTKSHekw E90	120 min	FIRES-JR-126-22-NURE2
	69	100-400	10 kg/m	1.2 m	HDGs E90	120 min	FIRES-JR-123-22-NURE
		100-400	10 kg/m	1.2 m	HDGsekwf E90	120 min	FIRES-JR-123-22-NURE
		100-400	10 kg/m	1.2 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		100-400	10 kg/m	1.2 m	HTKSHekw E90	120 min	FIRES-JR-126-22-NURE2
	75	100-400	10 kg/m	1.2 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2
		100-400	10 kg/m	1.2 m	HTKSHekw E90	120 min	FIRES-JR-126-22-NURE2
	62	100-400	10 kg/m	1.2 m	HTKSH E90	120 min	FIRES-JR-126-22-NURE2

Annex 3 Table 15

UDF					
Cable manufacturer	Group from Annex 1 or Annex 2	Max support spacing	Cable type	time	classification number
TECHNOKABEL	U3	0.6 m	HLGs E30-E90	120 min	FIRES-JR-028-18-NURE
		0.6 m	HDGszo E30-E90	120 min	FIRES-JR-028-18-NURE
		0.6 m	HTKSHekw E30-E90	120 min	FIRES-JR-028-18-NURE
		0.6 m	HTKSH E30-E90	120 min	FIRES-JR-028-18-NURE
		0.6 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-088-18-NURE
		0.6 m	HDGs-W E30-E90	120 min	FIRES-JR-088-18-NURE
		0.6 m	HLGs E30-E90	120 min	FIRES-JR-088-18-NURE
	B2	0.3 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-119-18-NURE
		0.3 m	(N)HXXH E90 = (N)HXXH-J E90	120 min	FIRES-JR-119-18-NURE
		0.3 m	JE-H(St)H E90	120 min	FIRES-JR-119-18-NURE
	U3	0.6 m	NHXXH E90 = NHXXH-J E90	120 min	FIRES-JR-119-18-NURE
TELEFONIKA	B2	0.3 m	FLAME-X 950 HDGs E30-E90	120 min	FIRES-JR-074-18-NURE

		0.3 m	FLAME-X 950 HTKSH E90	120 min	FIRES-JR-074-18-NURE
BITNER	B2	0.3 m	BiTflame AS E90	120 min	FIRES-JR-126-22-NURE2
		0.3 m	BiTflame AS(St) E90	120 min	FIRES-JR-126-22-NURE2

Annex 3 Table 16

Rung + cable clamp					
Cable manufacturer	Group from Annex 1 or Annex 2	Max support spacing	Cable type	time	classification number
TECHNOKABEL	U1	0.6 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-028-18-NURE
		0.6 m	(N)HXCH E90	120 min	FIRES-JR-028-18-NURE
	B1	0.3 m	NHXH E90 = NHXH-J E90	120 min	FIRES-JR-119-19-NURE
		0.3 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-119-19-NURE
		0.3 m	JE-H(St)H E90	120 min	FIRES-JR-119-19-NURE

Annex 3 Table 17

KSA					
Cable manufacturer	Group from Annex 1 or Annex 2	Max support spacing	Cable type	time	classification number
PRAKAB	B3	0.3 m	PRAFlaDur 1-CSKH-V180	120 min	FIRES-JR-085-15-NURS
BITNER	U4	0.6 m	HDGs E90	120 min	FIRES-JR-123-22-NURE
		0.6 m	HDGsekwf E90	120 min	FIRES-JR-123-22-NURE
		0.6 m	BiTflame S E90	120 min	FIRES-JR-123-22-NURE
		0.6 m	BiTflame S-M E90	120 min	FIRES-JR-123-22-NURE
		0.6 m	BiTflame S-M(St) E90	120 min	FIRES-JR-123-22-NURE
	B3	0.3 m	BiTflame S-M(St) E90	120 min	FIRES-JR-123-22-NURE
		0.3 m	BiTflame AS E90	120 min	FIRES-JR-126-22-NURE2
		0.3 m	BiTflame AS(St) E90	120 min	FIRES-JR-126-22-NURE2

Annex 3 Table 18

OZ/OZO						
Cable manufacturer	Group from Annex 1 or Annex 2	permissible load	Max support spacing	Cable type	time	classification number
TECHNOKABEL	U6	6 kg/m	0.6 m	HDGszo E30-E90	120 min	FIRES-JR-047-16-NURE
BITNER	B4	6 kg/m	0.3 m	BiTflame AS E90	120 min	FIRES-JR-126-22-NURE2
		6 kg/m	0.3 m	BiTflame AS(St) E90	120 min	FIRES-JR-126-22-NURE2

Annex 3 Table 19

ZSK1					
Cable manufacturer	Group from Annex 1 or Annex 2	Max support spacing	Cable type	time	classification number
TECHNOKABEL	U9	0.6 m	(N)HXH E90 = (N)HXH-J E90	120 min	FIRES-JR-047-16-NURE

Since the DIN 4102-12:1998 standard does not provide for the E classification for fibre optic cables, Tables 20-21 present the time taken to maintain adequate functionality, i.e. a maximum change in attenuation of $\leq 1\text{dB/m}$ for single-mode fibre optics and $\leq 2\text{dB/m}$ for multimode fibre optics (in accordance with PN-EN 50582:2016-12)

Annex 3 Table 20

Manufacturer	Fibre optic type	Group and structure number from Annex 2	time	report
TECHNOKABEL	Technoflame FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2	S2 - 23	30 min	12400010-2
	Technoflame FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2	K4 - 3	30 min	FOC-2-09/2020
BITNER	BiTfiber Flame CLT 12 SMF G652D	S2 - 66	30 min	1614/BW/21

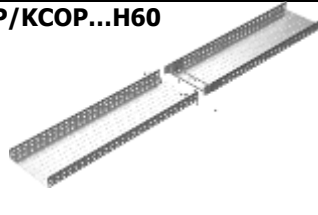
Annex 3 Table 21

Manufacturer	Fibre optic type	Group from Annex 1 or Annex 2	time	report
TECHNOKABEL	Technoflame FOC-2-SLT-HFFR PH120/E30 9/125 SM	U3	30 min	901/BW/21
	Technoflame FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2	U6	30 min	12400010-2
	Technoflame FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2	U4	30 min	12400010-2
	Technoflame FOC-2-SLT-HFFR PH120/E30-E60 50/125 OM2	B2	60 min	12400010-2
BITNER	BiTfiber Flame CLT 12 SMF G652D	B2	60 min	1614/BW/21

Annex 4

Connection of cable trays and racks, channels and wire mesh trays

KCP/KCOP...H60



Connector

LPP/LPOPH60
or LPLPH60
LPU2H60

Connection plate

BL/BLO...

Number of SGKM6x... bolts per connection.		
Width	Connection plate	Connector
100	4	4
150	4	4
200	4	4
300	8	4
400	8	4
500	8	4
600	8	4

KGL100H42

KGL/KGOL...H60

KCL100H42

KCL/KCOL...H60

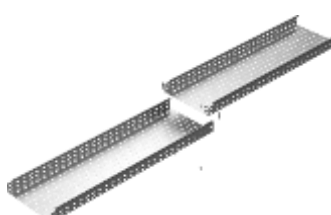
KBL...H60

KGJ/KGOJ...H60

KCJ/KCOJ...H60

KBJ...H60

KCD/KCOD...H60



Number of SGKM6x... bolts per connection.		
Width	base	sidewall
50		2
100	2	2
150	2	2
200	2	2
300	2	2
400	4	2

KFL...H60

KFJ...H60

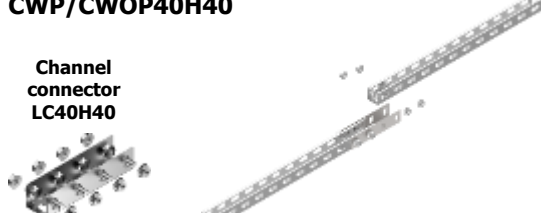
Screwless connection



CWP/CWOP40H40

Channel connector

LC40H40



DUD...H45

DUJ...H60

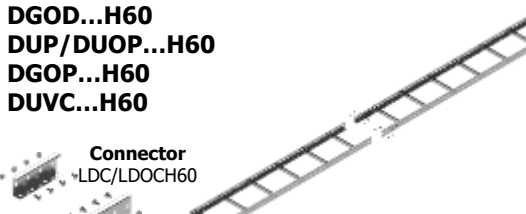
DUD...H60

DGOD...H60

DUP/DUOP...H60

DGOP...H60

DUVC...H60

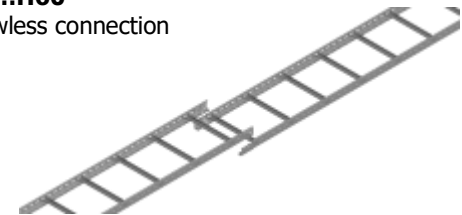


Connector

LDC/LDOCH60

DFP...H60

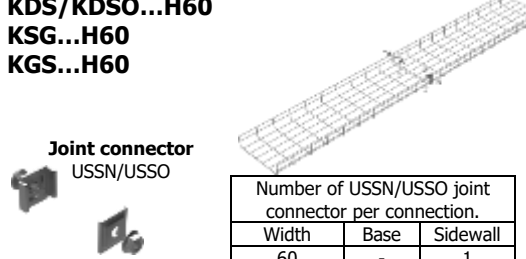
Screwless connection



KDS/KDSO...H60

KSG...H60

KGS...H60



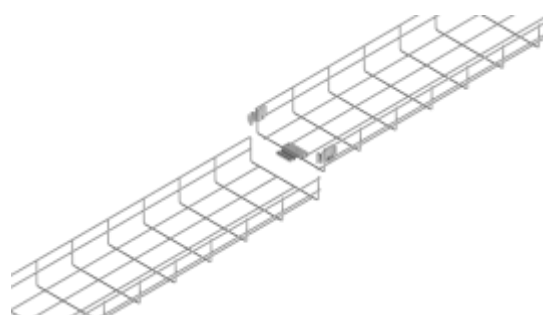
Joint connector

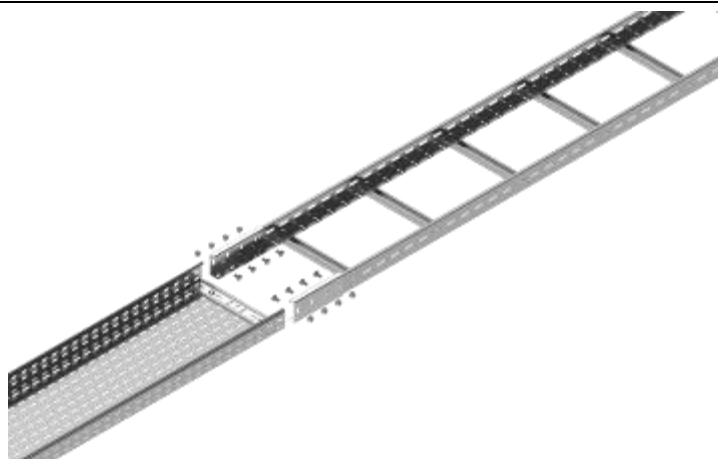
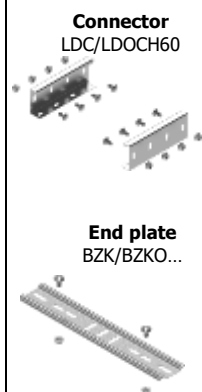
USSN/USSO

Number of USSN/USSO joint connector per connection.		
Width	Base	Sidewall
60	-	1
100	1	1
200	1	1
300	2	1
400	2	1
500	3	1
600	3	1

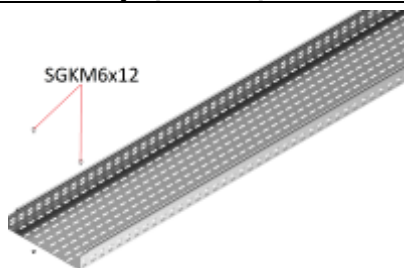
KDSZ...H60

Screwless connection

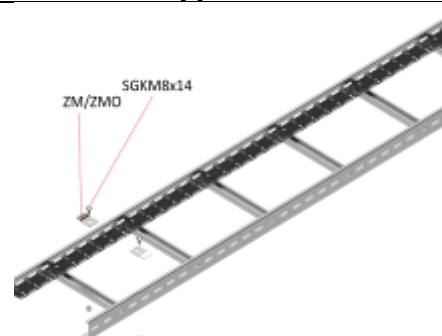


Tray-rack connection**CONNECTION OF TRAYS/RACKS/MESH TO SUPPORT STRUCTURE****Details of trays / racks / wire mesh trays connection to the support structure****Trays**

SGKM6x12



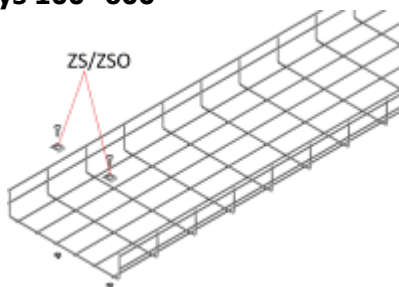
If necessary, use PW6 enlarged washers

RacksZM/ZMD
SGKM8x14

If necessary, use PW8 enlarged washers

Mesh trays 100- 600

ZS/ZSO



If necessary, use PW6 enlarged washers

Mesh trays 60H60

SGKM6x12

USK



If necessary, use PW6 enlarged washers

END OF THE NATIONAL TECHNICAL ASSESSMENT

National Technical Assessment made by	jr. brig. mgr inż. Grzegorz Mroczko Title or equivalent identification, first and last name	22 February 2023 Date, signature
National Technical Assessment, issue 2, authorised by	mgr inż. Konrad Zaciera Title or equivalent identification, first and last name	22 February 2023 Date, signature

ADDITIONAL INFORMATION**Regulations**

1. Act of 16 April 2004 on construction products (Dz No. 2021, item 1213).
2. Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Dz. U. 2016, item 1968).
3. Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the methods of declaring the performance of construction products and the method of marking them with a construction mark (Dz. U. of 2016, item 1966, as amended).
4. Regulation of the Minister of Infrastructure of 12 April 2002 on the technical conditions to be met by buildings and their location (consolidated text, Dz.U. 2022, item 1225).

Changes made to the CNBOP-PIB National Technical Assessment

In this CNBOP-PIB National Technical Assessment the following changes have been introduced in relation to the CNBOP-PIB National Technical Assessment No. CNBOP-PIB-KOT-2023/0371-3703 issue 1:

1. in section 2.3.2, subsection 18 was added. - possibility of fixing light fixtures with weight up to 20 kg made of non-combustible materials to horizontal channel sections forming part of the support structures (structure number 9 in Annex 2) provided that the permissible load of the structure is not exceeded.
2. the list: Reports, test reports, evaluations, classifications, used in the procedure for issuing the National Technical Assessment has been supplemented with the letter/opinion No. Hu-001-23 dated 10.01.2023 issued by Fires, s.r.o. Osloboditeľ'ov 282, 059 35 Batizovce, Slovakia.