

Vertical ladders

Technical information



Table of contents

Vertical ladders	4	Vertical ladder STU 50	12	Planning advices	34
Product description	5	Technical data	13	Standards and certificates	34
		Vertical ladder STU 50-3E	14	Corrosion protection	35
System overview	6	Technical data	15	Surface coatings and materials	36
		Covers and accessories STU 50, STU 50-3E	16	Calculations for selecting the right system	38
Vertical ladder LGG 60	8			Useful information	40
Technical data	9	Vertical ladder STU 60	18	Testing according to DIN EN 61537	41
Covers and accessories LGG 60	10	Technical data	19		
		Vertical ladder STU 62	21	Service	42
		Technical data	22	Our synergy concept for you	42
		Covers and accessories STU 60, STU 62	24		
		Vertical ladder ST 81	26		
		Technical data	27		
		Vertical ladder ST 82	29		
		Technical data	30		
		Accessories ST 81, ST 82	32		



Vertical ladders

Product description

Vertical ladders are the ideal solution if you need to route your electrical cables and lines vertically. Typical areas of application (among others) are vertical ducts in buildings or industrial halls. The vertical ladders can be mounted directly on the wall or can be installed free-standing. The strengths of the product lie in the way it allows cables to be attached securely in conjunction with PUK cable clamps.

The standard range offers vertical ladders in light, medium and heavy-duty designs. For truly effective cable routing, our heavy-duty vertical ladders enable you to attach cables on both sides. The system is available with perforated side rails in an L-, U- or I-profile.

Depending on the corrosion protection requirements of the application area, our vertical ladders can be supplied with a sendzimir or hot-dip galvanised finish or in a stainless steel version. They can be attached quickly and easily using head and base plates, angle brackets or the relevant fastenings.



Benefits

- Vertical routing of cables using a product that can be wall-mounted or installed free-standing
- Allows horizontal cables to continue their journey in a vertical direction
- Compatible with virtually all cable types and diameters
- High level of heat dissipation
- Permeable to air
- Customisable on request



Special solutions

If necessary - and depending on the application - the rung spacing and rung types can also be varied. Just get in touch! We will be happy to advise you.

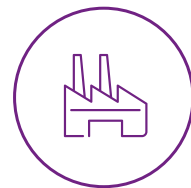
Areas of application



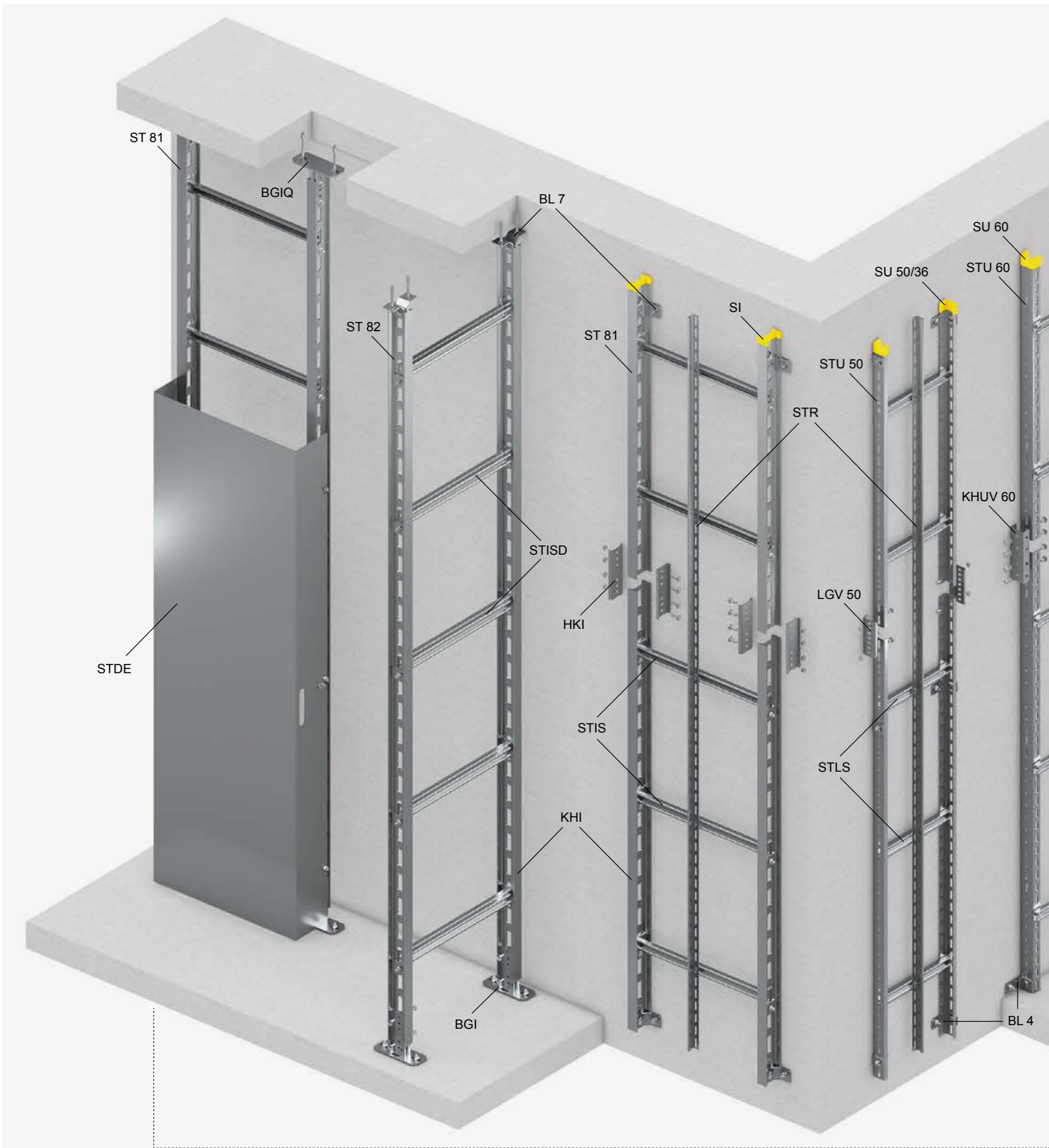
On walls or free-standing for technical building equipment (TBE) – indoors and outdoors



Offices, department stores, schools or universities



Production halls, industrial buildings and plant construction



AC
Matching cable clamp
for fastening to the rung
of a vertical ladder

LGG 60

Vertical ladder, welded



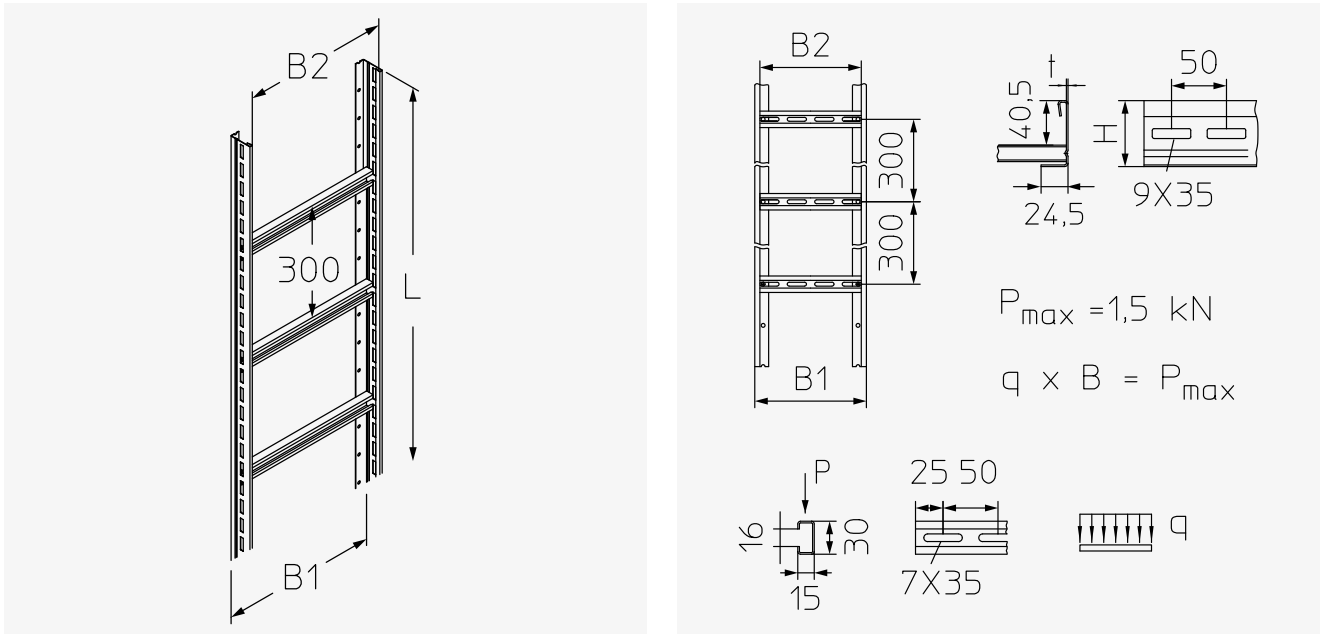
Product features

- L-profile side rails, holes all the way along
- The additional holes in the leg are perfect for mounting the product directly to the wall
- For wall mounting / suitable for both wall and ceiling mounting
- Max. fastener spacing 1.5 m
- Rung for H clamp (slot size 16 mm)
300 mm rung spacing
- Cables can be attached on one side
- Suitable for circuit integrity maintenance; for technical parameters, see general technical approval document (AbP)

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G _S kg	G _F kg
LGG 60-20-3	60	203	185	3000	1.50	7.92	8.48
LGG 60-30-3	60	303	285	3000	1.50	8.61	9.21
LGG 60-40-3	60	403	385	3000	1.50	9.30	9.95
LGG 60-50-3	60	503	485	3000	1.50	9.98	10.68
LGG 60-60-3	60	603	585	3000	1.50	10.67	11.42
LGG 60-20	60	203	185	6000	1.50	15.84	16.95
LGG 60-30	60	303	285	6000	1.50	17.22	18.42
LGG 60-40	60	403	385	6000	1.50	18.59	19.89
LGG 60-50	60	503	485	6000	1.50	19.96	21.36
LGG 60-60	60	603	585	6000	1.50	21.34	22.83

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

Model - Width - Length* Surf./mat.
 (in cm) (in m)

LGG 60	-	20	-	3	S
--------	---	----	---	---	---

*The standard length of 6 m is not explicitly stated in the item number.

Covers and accessories LGG 60



RD
 Cable tray cover, positive locking

B	Surf./mat.	B	Surf./mat.
mm		mm	
50	S F E E4	400	S F E E4
100	S F E E4	500	S F E E4
200	S F E E4	600	S F E E4
300	S F E E4		



To raise the cover, you need the STD-A cover elevator and associated fastenings.



Example order

Model	B (cm)	Surf./mat.
RD	20	F

B: Width | Surf./mat.: Surface/materials



STD-A
 Cover elevator

H	L	Surf./mat.
mm	mm	
150	1500	S F E
180	1500	S F E



In order to screw the STD-A to the LGG 60, you will need three KLS 8x16 clamping assemblies. If the cable tray cover is sendzimir galvanised, three BS 4.2x13GV drilling screws must be used to attach the cover to the STD-A.

In the case of the hot-dip galvanised or stainless steel versions, three BLS 3.9x13E tapping screws are required. For an RD cover with a length of 3000 mm, you will need four STD-A cover elevators.

Please pay careful attention to the number of fastenings required in each case. The fastenings must be ordered separately.



Example order

Model	H (mm)	Surf./mat.
STD-A	150	F

H: Height | L: Length

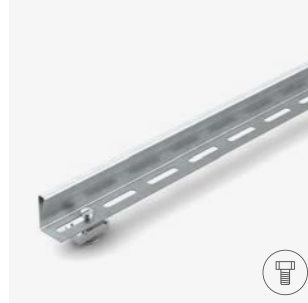
Surf./mat.: Surface/materials



H
Cable clamp for fastening to
profile rails
AL V E4



LGV 60
Cable ladder connector
S F E E4



LGTR 60/100
Cable ladder separating strip
S F E E4



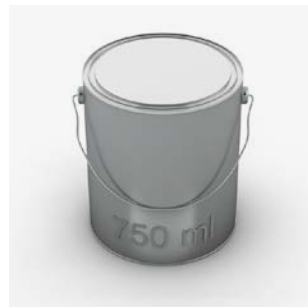
BL 4
Corner angle
GV F E E4



LH
Ladder support
F



SL 60
Protection end cap
PE



KZF
Cold zinc paint
750 ml



KZS
Cold zinc spray
400 ml



Example order for cable ladder connector

Model Surf./mat.

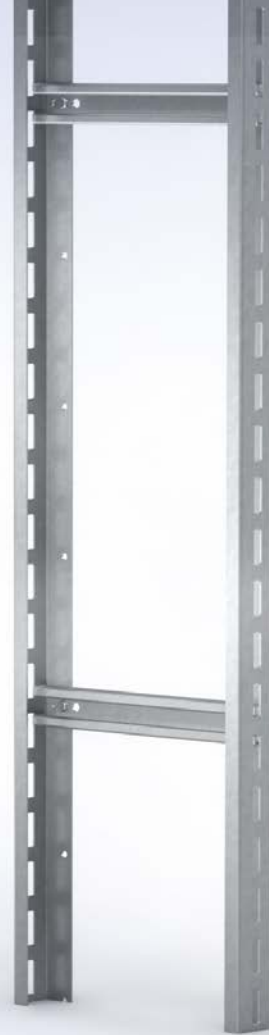
LGV 60 F



Fastening screws
included with delivery

STU 50

Vertical ladder, riveted



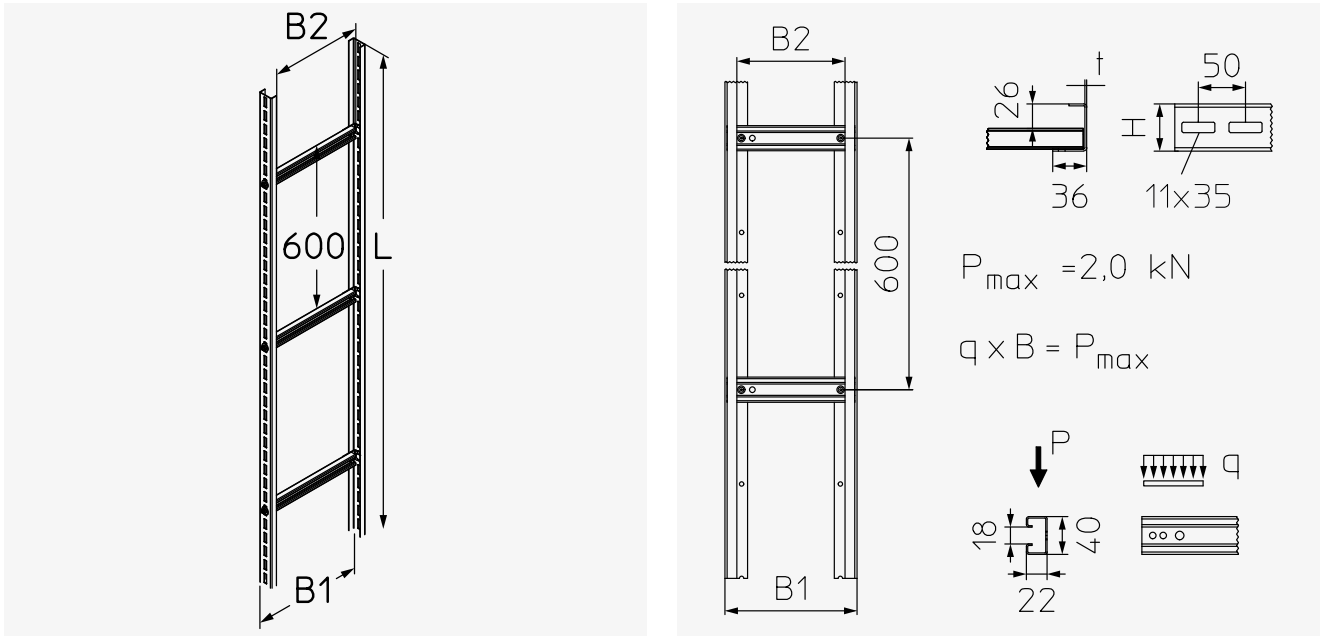
Product features

- Unequal U-profile side rails, holes all the way along
- The additional holes in the leg are perfect for mounting the product directly to the wall
- For wall mounting / suitable for both wall and ceiling mounting
- Max. fastener spacing 1.5 m
- Rung for AC clamp (slot size 18 mm)
600 mm rung spacing
- Cables can be attached on one side
- The STU-BS 50 vertical ladder is suitable for circuit integrity maintenance; for technical parameters, see general technical approval document (AbP)

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G _S kg	G _F kg
STU 50-02-3	50	210	172	3000	2.00	9.75	10.50
STU 50-03-3	50	300	262	3000	2.00	10.35	11.05
STU 50-04-3	50	400	362	3000	2.00	10.90	11.65
STU 50-05-3	50	500	462	3000	2.00	11.50	12.30
STU 50-06-3	50	600	562	3000	2.00	12.05	12.90
STU 50-07-3	50	700	662	3000	2.00	12.65	13.55
STU 50-08-3	50	800	762	3000	2.00	13.25	14.15
STU 50-02	50	210	172	6000	2.00	19.50	21.00
STU 50-03	50	300	262	6000	2.00	20.70	22.10
STU 50-04	50	400	362	6000	2.00	21.80	23.30
STU 50-05	50	500	462	6000	2.00	23.00	24.60
STU 50-06	50	600	562	6000	2.00	24.10	25.80
STU 50-07	50	700	662	6000	2.00	25.30	27.10
STU 50-08	50	800	762	6000	2.00	26.50	28.30

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

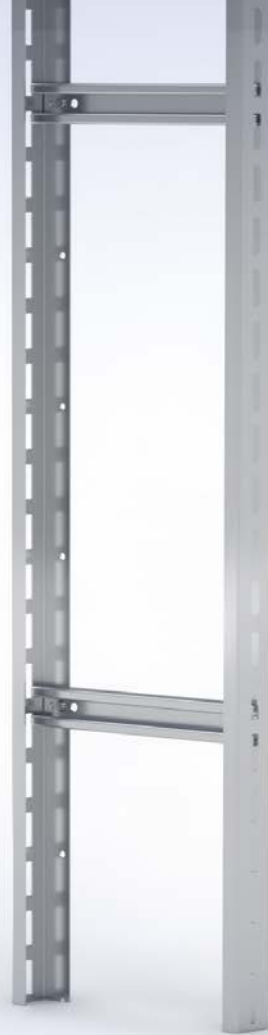
Model - Width - Length Surf./mat.
 (in m) (in m)

STU 50	-	02	-	3	S
--------	---	----	---	---	---

*The standard length of 6 m is not explicitly stated in the item number.

STU 50-3E

Vertical ladder, screwed



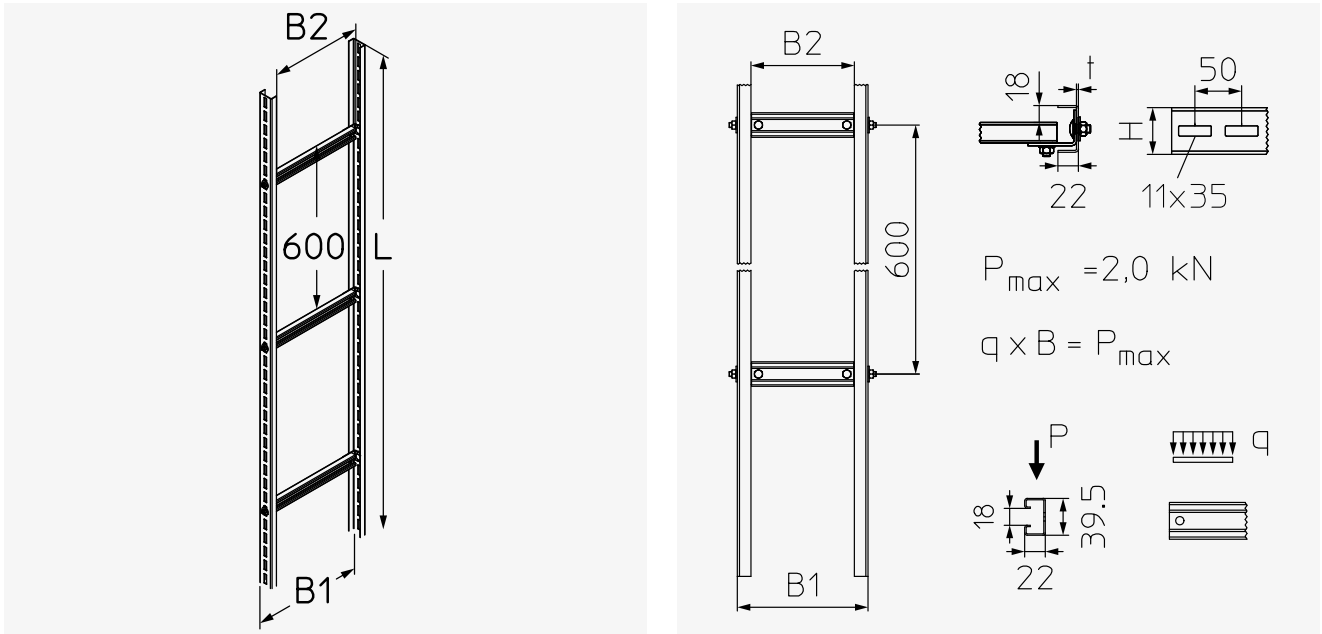
Product features

- Equal U-profile side rails, holes all the way along
- For wall mounting / suitable for both wall and ceiling mounting
- Max. fastener spacing 1.5 m
- Rung for AC clamp (slot size 18 mm)
600 mm rung spacing
- Cables can be attached on one side

Available surface coatings and materials

- E** Stainless steel, material no. 1.4301 (V2A)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G _E kg
STU 50-02-3E	50	210	166	3000	2.00	10.40
STU 50-03-3E	50	300	256	3000	2.00	10.90
STU 50-04-3E	50	400	356	3000	2.00	11.40
STU 50-05-3E	50	500	456	3000	2.00	11.90
STU 50-06-3E	50	600	556	3000	2.00	12.40
STU 50-07-3E	50	700	656	3000	2.00	12.90
STU 50-08-3E	50	800	756	3000	2.00	13.50

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight

Example order



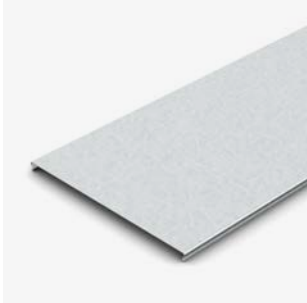
Model - Width - Length Surf./mat.
 (in m) (in m)

STU 50 - 02 - 3 E



Any optional accessories
 must be ordered separately

Covers and accessories STU 50, STU 50-3E



RD

Cable tray cover, positive locking

B	Surf./mat.	B	Surf./mat.
mm		mm	
50	S F E E4	400	S F E E4
100	S F E E4	500	S F E E4
200	S F E E4	600	S F E E4
300	S F E E4		



To raise the cover, you need the STD-A cover elevator and associated fastenings.



Example order

Model B (cm) Surf./mat.

RD	20	F
-----------	-----------	----------

B: Width | Surf./mat.: Surface/materials



STD-A

Cover elevator

H	L	Surf./mat.
mm	mm	
150	1500	S F E
180	1500	S F E



In order to screw the STD-A to the STU 50, you will need three KLS 10x20 clamping assemblies. If the cable tray cover is sendzimir galvanised, three BS 4.2x13GV drilling screws must be used to attach the cover to the STD-A.

In the case of the hot-dip galvanised or stainless steel versions, three BLS 3.9x13E tapping screws are required. For an RD cover with a length of 3000 mm, you will need four STD-A cover elevators.

Please pay careful attention to the number of fastenings required in each case. The fastenings must be ordered separately.



Example order

Model H (mm) Surf./mat.

STD-A	150	F
--------------	------------	----------

H: Height | L: Length | Surf./mat.: Surface/materials



STLS

Rung retrofit kit for STU 50 (screwed or riveted)
 Attach rungs prior to mounting on wall.

B	Surf./mat.	B	Surf./mat.
mm		mm	
203	S F	593	S F
293	S F	693	S F
393	S F	793	S F
493	S F		



Example order

Model B (cm) Surf./mat.

STLS 50	20	F
----------------	-----------	----------

B: Width | Surf./mat.: Surface/materials



STUS 50

Rung retrofit kit for STU 50-3E
 Attach rungs prior to mounting on wall.

B	Surf./mat.	B	Surf./mat.
mm		mm	
200	E	800	E
300	E	900	E
400	E	1000	E
500	E	1100	E
600	E	1200	E
700	E		



Example order

Model B (cm) Surf./mat.

STUS 50	20	E
----------------	-----------	----------

B: Width | Surf./mat.: Surface/materials



Fastening screws included with delivery



AC
Cable clamp for fastening to profile rails
AL V E4



LGV 50
Cable ladder connector
S F E E4



STR 50/110
Vertical ladder separating strip
S F E



BGUQ 50
Screwed head plate turned 90°
F E E4



BL 4
Corner angle
GV F E E4



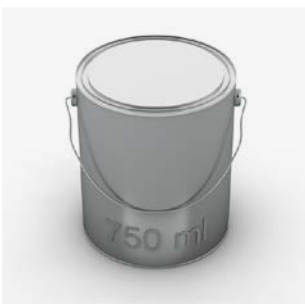
LH
Ladder support
F



SU 50/36
Protection cap (STU 50)
PE



SU 50/22
Protection cap (STU 50-3E)
PE



KZF
Cold zinc paint
750 ml



KZS
Cold zinc spray
400 ml



Example order
Cable ladder connector

Model Surf./mat.

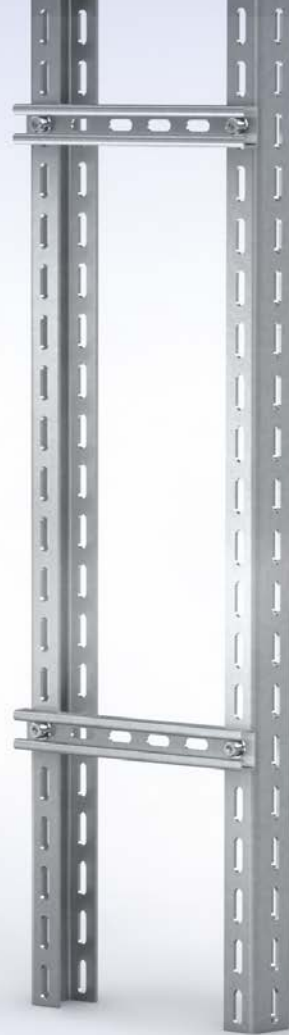
LGV 50 F



Fastening screws included with delivery

STU 60

Vertical ladder, screwed



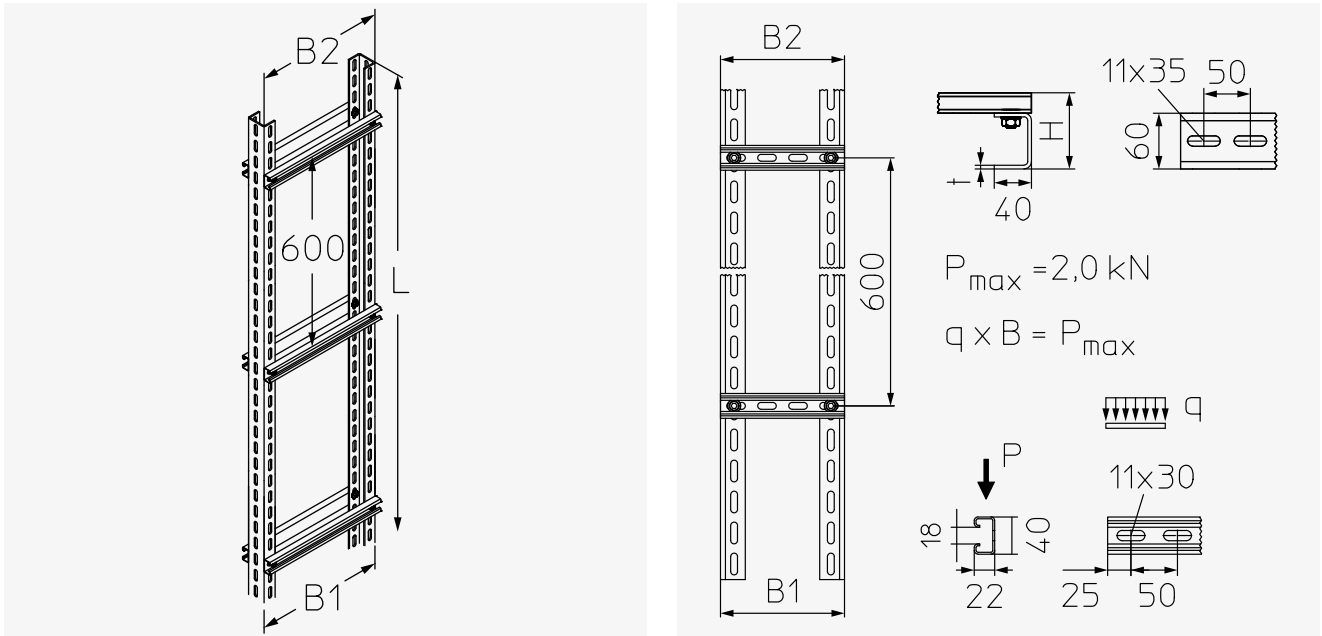
Product features

- Equal U-profile side rails, rows of continuous holes on three sides
- For wall mounting / suitable for both wall and ceiling mounting / suitable for free-standing installation
- Max. fastener spacing for wall mounting: 3.0 m or for free-standing installation: 4.5 m
- Rung for AC clamp (slot size 18 mm)
600 mm rung spacing
- Cables can be attached on one side

Available surface coatings and materials

- F** Hot-dip galvanised in accordance with DIN EN ISO 1461
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G _F kg	G _E kg
STU 60-02-3	82	200	200	3000	2.00	22.98	21.67
STU 60-03-3	82	300	300	3000	2.00	23.75	22.41
STU 60-04-3	82	400	400	3000	2.00	24.52	23.16
STU 60-05-3	82	500	500	3000	2.00	24.95	24.09
STU 60-06-3	82	600	600	3000	2.00	26.06	24.65
STU 60-07-3	82	700	700	3000	2.00	26.84	25.39
STU 60-08-3	82	800	800	3000	2.00	27.61	26.14
STU 60-09-3	82	900	900	3000	2.00	28.38	26.88
STU 60-10-3	82	1000	1000	3000	2.00	28.81	27.62
STU 60-11-3	82	1100	1100	3000	2.00	29.93	28.37
STU 60-12-3	82	1200	1200	3000	2.00	30.70	29.11

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

Model - Width - Length Surf./mat.
 (in m) (in m)

STU 60 - 02 - 3 F

Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G F kg	G E kg
STU 60-02	82	200	200	6000	2.00	45.95	43.34
STU 60-03	82	300	300	6000	2.00	47.49	44.83
STU 60-04	82	400	400	6000	2.00	49.04	46.32
STU 60-05	82	500	500	6000	2.00	50.58	47.80
STU 60-06	82	600	600	6000	2.00	52.12	49.29
STU 60-07	82	700	700	6000	2.00	53.67	50.78
STU 60-08	82	800	800	6000	2.00	55.21	52.27
STU 60-09	82	900	900	6000	2.00	56.76	53.76
STU 60-10	82	1000	1000	6000	2.00	58.30	55.25
STU 60-11	82	1100	1100	6000	2.00	59.85	56.74
STU 60-12	82	1200	1200	6000	2.00	61.39	58.23

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

Model - Width Surf./mat.
(in m)

STU 60	-	02	F
--------	---	----	---

*The standard length of 6 m is not explicitly stated in the item number.



Any optional accessories must be ordered separately

STU 62

Vertical ladder, screwed,
cables can be attached on both sides



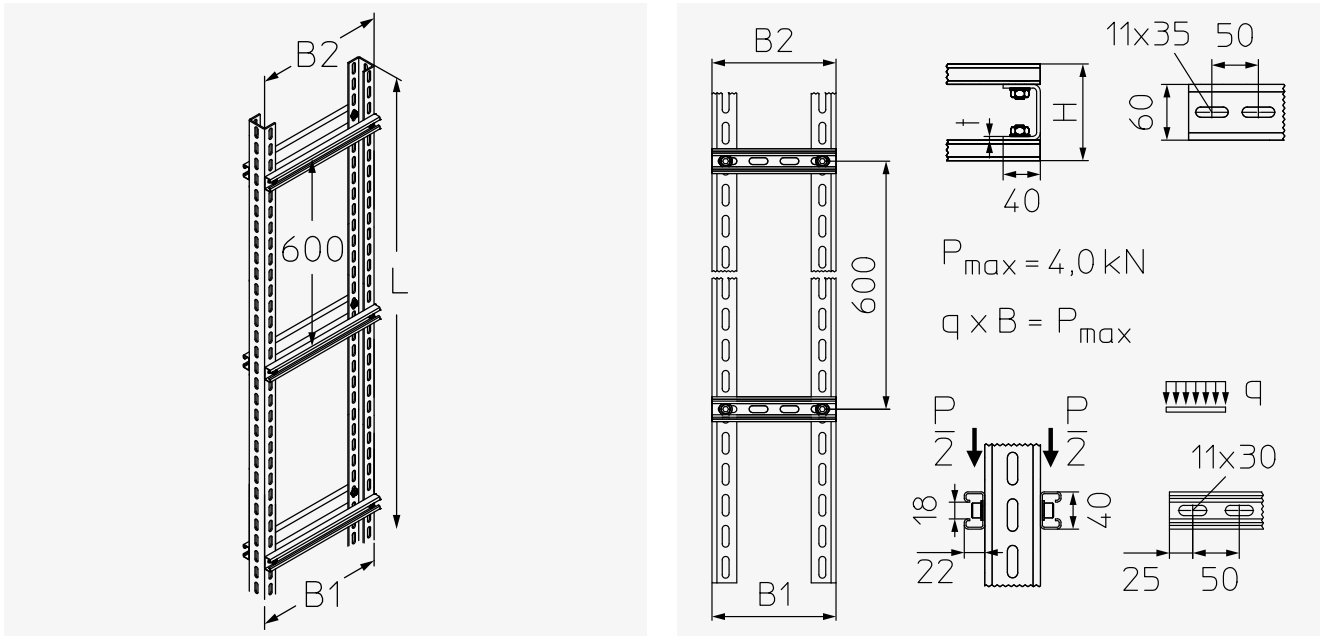
Product features

- Equal U-profile side rails, rows of continuous holes on three sides
- Fixing: Free-standing
- Max. fastener spacing for free-standing installation: 4.5 m
- 2x rungs for AC clamp (slot size 18 mm), 600 mm rung spacing
- Cables can be attached on both sides

Available surface coatings and materials

- F** Hot-dip galvanised in accordance with DIN EN ISO 1461
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G F kg
STU 62-02-3	104	200	200	3000	4.00	24.90
STU 62-03-3	104	300	300	3000	4.00	26.43
STU 62-04-3	104	400	400	3000	4.00	27.98
STU 62-05-3	104	500	500	3000	4.00	28.81
STU 62-06-3	104	600	600	3000	4.00	31.06
STU 62-07-3	104	700	700	3000	4.00	32.61
STU 62-08-3	104	800	800	3000	4.00	34.15
STU 62-09-3	104	900	900	3000	4.00	35.70
STU 62-10-3	104	1000	1000	3000	4.00	36.53
STU 62-11-3	104	1100	1100	3000	4.00	38.69
STU 62-12-3	104	1200	1200	3000	4.00	40.33

H: Height | B: Width | L: Length | P_{max}: Maximum rung load with cables attached on both sides | G: Weight



Example order

Model - Width - Length Surf./mat.
(in m)

STU 62 - 02 - 3 F

Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G F kg
STU 62-02	104	200	200	6000	4.00	49.80
STU 62-03	104	300	300	6000	4.00	52.86
STU 62-04	104	400	400	6000	4.00	55.96
STU 62-05	104	500	500	6000	4.00	59.04
STU 62-06	104	600	600	6000	4.00	62.12
STU 62-07	104	700	700	6000	4.00	65.22
STU 62-08	104	800	800	6000	4.00	68.30
STU 62-09	104	900	900	6000	4.00	71.40
STU 62-10	104	1000	1000	6000	4.00	74.48
STU 62-11	104	1100	1100	6000	4.00	77.38
STU 62-12	104	1200	1200	6000	4.00	80.66

H: Height | B: Width | L: Length | P_{max}: Maximum rung load with cables attached on both sides | G: Weight



Example order

Model - Width Surf./mat.

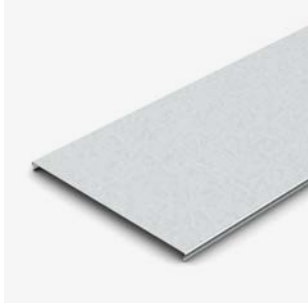
STU 62 - 02 F

*The standard length of 6 m is not explicitly stated in the item number.



Any optional accessories must be ordered separately

Covers and accessories STU 60, STU 62



RD

Cable tray cover, positive locking

B	Surf./mat.	B	Surf./mat.
mm		mm	
50	S F E E4	400	S F E E4
100	S F E E4	500	S F E E4
200	S F E E4	600	S F E E4
300	S F E E4		



To raise the cover, you need the STD-A cover elevator and associated fastenings.



Example order

Model	B (cm)	Surf./mat.
RD	20	F

B: Width | Surf./mat.: Surface/materials



STD-A

Cover elevator

H	L	Surf./mat.
mm	mm	
150	1500	S F E
180	1500	S F E



In order to screw the STD-A to the STU 50, you will need three KLS 10x20 clamping assemblies. If the cable tray cover is sendzimir galvanised, three BS 4.2x13GV drilling screws must be used to attach the cover to the STD-A.

In the case of the hot-dip galvanised or stainless steel versions, three BLS 3.9x13E tapping screws are required. For an RD cover with a length of 3000 mm, you will need four STD-A cover elevators. Please pay careful attention to the number of fastenings required in each case. The fastenings must be ordered separately.



Example order

Model	H (mm)	Surf./mat.
STD-A	150	F

H: Height | L: Length | Surf./mat.: Surface/materials



STUS 60

Rung retrofit kit for STU 60
 Rungs can be screwed in place as part of the installation process and also at a later time

B	Surf./mat.	B	Surf./mat.
mm		mm	
200	E	800	E
300	E	900	E
400	E	1000	E
500	E	1100	E
600	E	1200	E
700	E		



Example order

Model	B (cm)	Surf./mat.
STUS 60	20	F

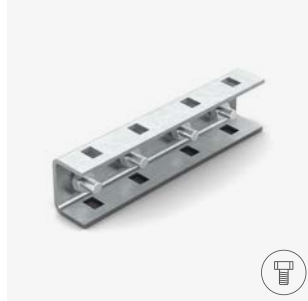
B: Width | Surf./mat.: Surface/materials



Fastening screws included with delivery



AC
 Cable clamp for fastening to
 profile rails
AL V E E4



KHUV 60
 Connector
F E E4



STR 50/110
 Vertical ladder separating
 strip
S F E



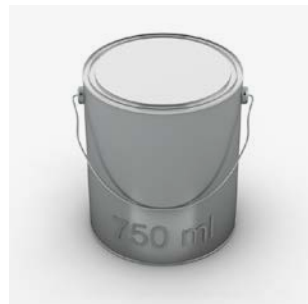
BGU 60
 Screwed head plate
F E E4



BL 4
 Corner angle
GV F E E4



SU 60
 Protection end cap
PE



KZF
 Cold zinc paint
 750 ml



KZS
 Cold zinc spray
 400 ml



Example order for connector

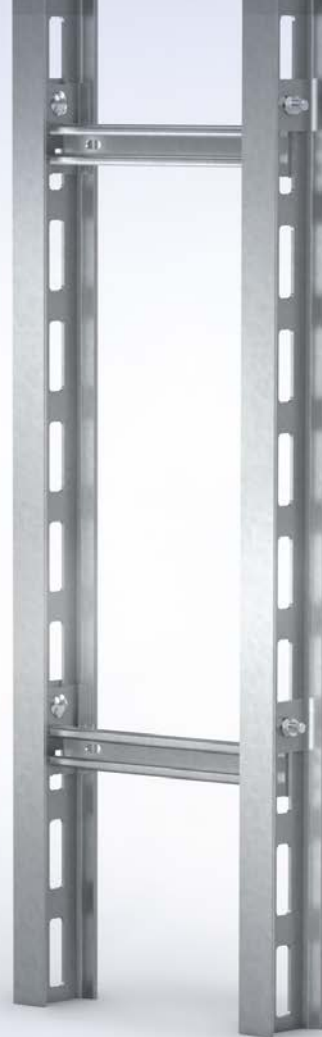
Model	Surf./mat.
KHUV 60	F



Fastening screws
 included with delivery

ST 81

Vertical ladder, screwed



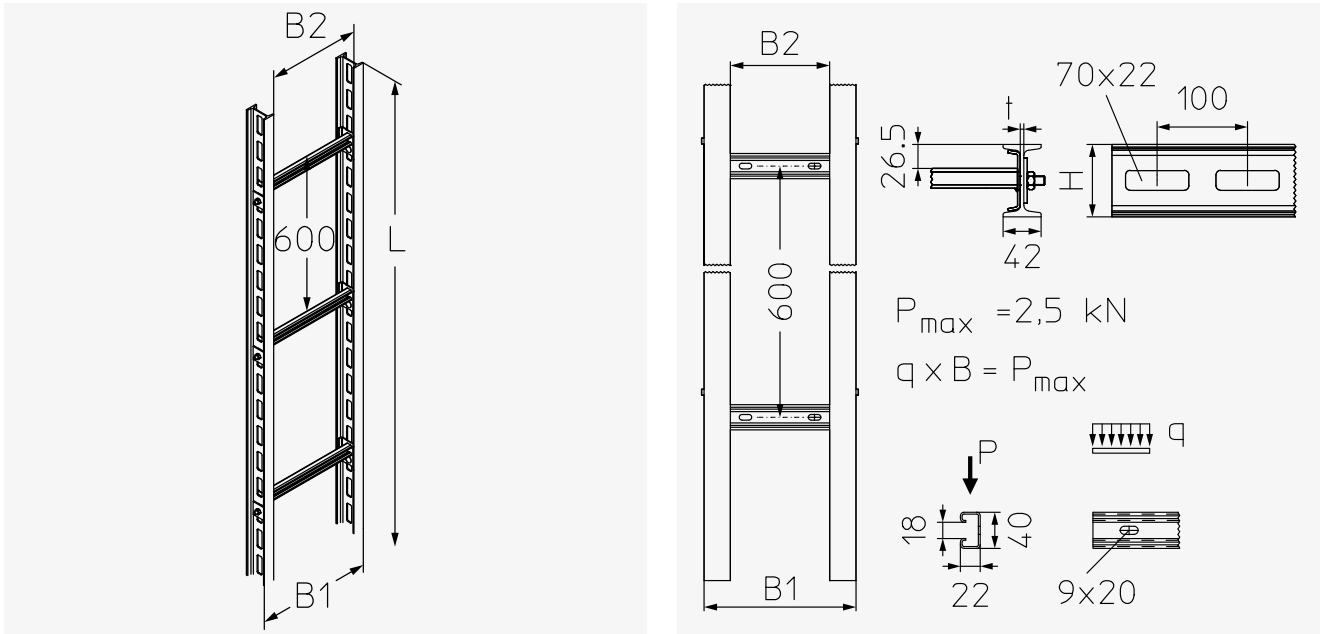
Product features

- I-profile side rails, row of continuous elongated holes in the web
- For wall mounting / suitable for both wall and ceiling mounting / suitable for free-standing installation
- Max. fastener spacing for wall mounting: 3.0 m, or for free-standing installation: 6.0 m
- Rung for AC clamp (slot size 18 mm), 600 mm rung spacing
- Cables can be attached on one side
- The STU-BS 81 vertical ladder is suitable for circuit integrity maintenance; for technical parameters, see general technical approval document (AbP)

Available surface coatings and materials

- F** Hot-dip galvanised in accordance with DIN EN ISO 1461

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G _F kg
ST 81-02-3	80	242	158	3000	2.50	41.24
ST 81-03-3	80	342	258	3000	2.50	42.09
ST 81-04-3	80	442	358	3000	2.50	42.89
ST 81-05-3	80	542	458	3000	2.50	43.74
ST 81-06-3	80	642	558	3000	2.50	44.54
ST 81-07-3	80	742	658	3000	2.50	45.39
ST 81-08-3	80	842	758	3000	2.50	46.19
ST 81-09-3	80	942	858	3000	2.50	47.04
ST 81-10-3	80	1042	958	3000	2.50	47.84
ST 81-11-3	80	1142	1058	3000	2.50	48.69
ST 81-12-3	80	1242	1158	3000	2.50	49.49

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

Model - Width - Length Surf./mat.
(in m)

ST 81 - 02 - 3 F

Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G F kg
ST 81-02	80	242	158	6000	2.50	82.50
ST 81-03	80	342	258	6000	2.50	84.00
ST 81-04	80	442	358	6000	2.50	85.50
ST 81-05	80	542	458	6000	2.50	87.00
ST 81-06	80	642	558	6000	2.50	88.50
ST 81-07	80	742	658	6000	2.50	90.00
ST 81-08	80	842	758	6000	2.50	91.50
ST 81-09	80	942	858	6000	2.50	93.00
ST 81-10	80	1042	958	6000	2.50	94.50
ST 81-11	80	1142	1058	6000	2.50	96.00
ST 81-12	80	1242	1158	6000	2.50	97.50

H: Height | B: Width | L: Length | P_{max}: Maximum rung point load | G: Weight



Example order

Model - Width Surf./mat.
(in cm)

ST 81	-	02	F
-------	---	----	---

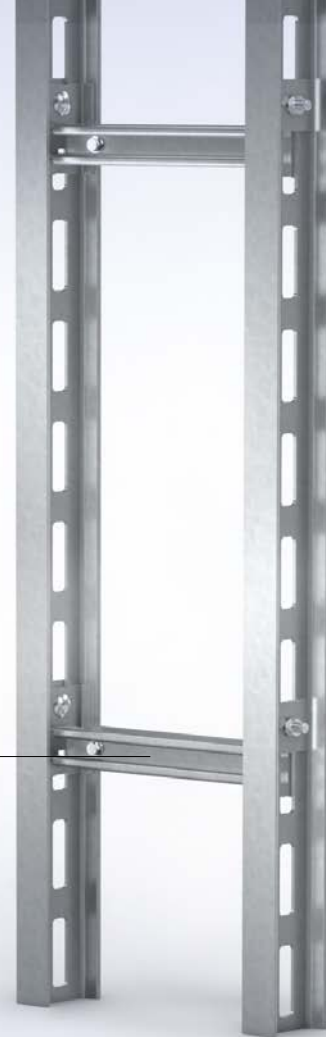
*The standard length of 6 m is not explicitly stated in the item number.



Any optional accessories must be ordered separately

ST 82

Vertical ladder, screwed,
cables can be attached on both sides



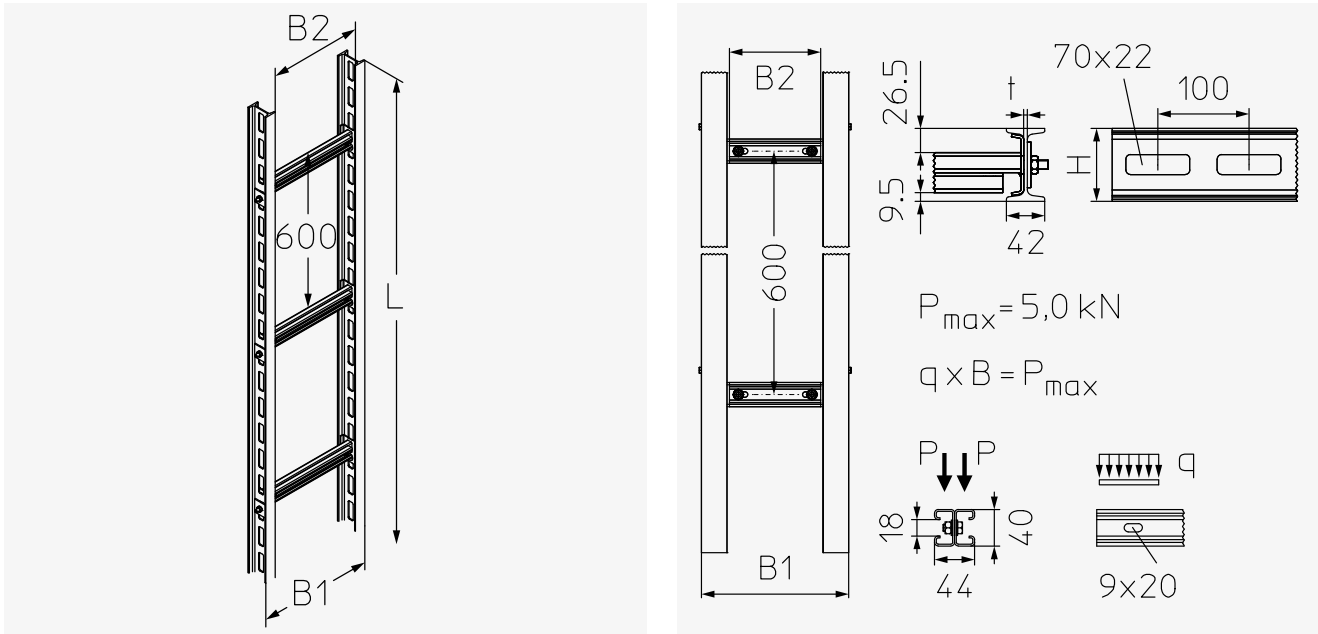
Product features

- I-profile side rails, row of continuous elongated holes in the web
- Fixing: Free-standing
- Max. fastener spacing for free-standing installation: 6.0 m
- Double rung for AC clamp (slot size 18 mm), 600 mm rung spacing
- Cables can be attached on both sides

Available surface coatings and materials

- F** Hot-dip galvanised in accordance with DIN EN ISO 1461

Technical data



Model	H mm	B1 mm	B2 mm	L mm	P _{max} kN	G F kg
ST 82-02-3	80	242	158	3000	5.00	42.55
ST 82-03-3	80	342	258	3000	5.00	44.15
ST 82-04-3	80	442	358	3000	5.00	45.71
ST 82-05-3	80	542	458	3000	5.00	47.30
ST 82-06-3	80	642	558	3000	5.00	48.15
ST 82-07-3	80	742	658	3000	5.00	50.50
ST 82-08-3	80	842	758	3000	5.00	52.10
ST 82-09-3	80	942	858	3000	5.00	53.70
ST 82-10-3	80	1042	958	3000	5.00	55.30
ST 82-11-3	80	1142	1058	3000	5.00	56.90
ST 82-12-3	80	1242	1158	3000	5.00	58.47

H: Height | B: Width | L: Length | P_{max}: Maximum rung load with cables attached on both sides | G: Weight



Example order

Model - Width - Length Surf./mat.
 (in cm) (in m)

ST 82 - 02 - 3 F

Model	H mm	B1 mm	B1 mm	L mm	P _{max} kN	G F kg
ST 82-02	80	242	158	6000	5.00	85.50
ST 82-03	80	342	258	6000	5.00	88.00
ST 82-04	80	442	358	6000	5.00	91.50
ST 82-05	80	542	458	6000	5.00	94.50
ST 82-06	80	642	558	6000	5.00	97.50
ST 82-07	80	742	658	6000	5.00	100.50
ST 82-08	80	842	758	6000	5.00	103.50
ST 82-09	80	942	858	6000	5.00	106.50
ST 82-10	80	1042	958	6000	5.00	109.50
ST 82-11	80	1142	1058	6000	5.00	112.50
ST 82-12	80	1242	1158	6000	5.00	115.50

H: Height | B: Width | L: Length | P_{max}: Maximum rung load with cables attached on both sides | G: Weight



Example order

Model - Width Surf./mat.
 (in cm)

ST 82	-	02	F
-------	---	----	---

*The standard length of 6 m is not explicitly stated in the item number.



Any optional accessories must be ordered separately

Accessories ST 81, ST 82



STDE

Collision protection with integrated handle openings for attachment to vertical ladders and anti-lift device.

H	B	Surf./ mat.	H	B	Surf./ mat.
mm	mm		mm	mm	
120	200	S F	150	200	S F
120	300	S F	150	300	S F
120	400	S F	150	400	S F
120	500	S F	150	500	S F
120	600	S F	150	600	S F
120	700	S F	150	700	S F
120	800	S F	150	800	S F
120	900	S F	150	900	S F
120	1000	S F	150	1000	S F
120	1100	S F	150	1100	S F
120	1200	S F	150	1200	S F



Example order

Model	H (mm)	-	B (cm)	Surf./mat.
STDE	120	-	20	S

H: Height | B: Width
 Surf./mat.: Surface/materials



STIS

Rung retrofit kit for ST 81

B	Surf./mat.	B	Surf./mat.
mm		mm	
200	F	800	F
300	F	900	F
400	F	1000	F
500	F	1100	F
600	F	1200	F
700	F		



Example order

Model	B (m)	Surf./mat.
STIS	02	F

B: Width | Surf./mat.: Surface/materials



STISD

Rung retrofit kit for ST 82

B	Surf./mat.	B	Surf./mat.
mm		mm	
200	F	800	F
300	F	900	F
400	F	1000	F
500	F	1100	F
600	F	1200	F
700	F		



Example order

Model	B (m)	Surf./mat.
STID	02	F

B: Width | Surf./mat.: Surface/materials



Fastening screws
 included with delivery



AC
 Cable clamp for fastening to
 profile rails
AL V E E4



HK1
 Connector
F



STR 110
 Vertical ladder separating
 strip
S F E



BGI
 Screwed head plate
F



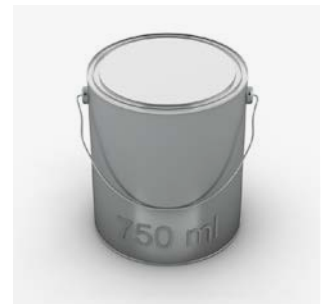
BGIQ
 Screwed head plate
 turned 90°
F



BL7
 Corner angle
GV F



SI
 Protection end cap
PE



KZF
 Cold zinc paint
 750 ml



KZS
 Cold zinc spray
 400 ml



Example order for connector

Model	Surf./mat.
HK1	F



Fastening screws
 included with delivery

Planning advices

Standards and certificates

Standards

Test standard DIN EN 61537 provides the technical basis for cable management systems.

This standard determines which test procedure is to be followed when testing the mechanical properties of the cable management elements. PohlCon constantly carries out extensive tests to ensure that the cable management systems it produces remain functional and fit for use at all times.

Retention of function in the event of a fire

Our assembly instructions and technical information contain important safety details that must be heeded during assembly and use. Adhering to these ensures optimum safety of the cable management system used.

The maintenance of function of the normed supporting constructions and the system-specific-specified support systems in the event of fire are designed in accordance with DIN 4102-12. DIN 4102-12 specifies the requirements and testing for the maintenance of function of electrical cable systems in the event of fire.

Certificates

As a manufacturer of cable management systems and associated components, PohlCon attaches great importance to product quality. Throughout the entire value chain, high standards of quality apply across all departments with a view to developing the best possible system for a range of complex application areas. In order for this quality standard to be achieved and monitored long term, PUK cable management systems are externally monitored and subject to in-house inspections.

On our own test benches, we test our cable management systems according to the strict specifications of DIN EN 61537, especially with regard to load-bearing capacity and functionality. This is supplemented by our quality management system, which has been established in the company since 1995.

Our quality management system is also capable of accommodating higher requirements, such as those in the petrochemical industry, and it is backed up by the SCCP certificate.

Corrosion protection

Basic information

Corrosion is the reaction of a metallic material with its environment. This leads to a change in the material and impairs the ability of a metallic component – or an entire system – to function. Corrosive media can take the form of room air, contamination in the air, water, a marine atmosphere or other chemicals. Interactions between these corrosive media cause a corrosive layer to form, leading to metal attack.

If corrosion damage does occur, very high costs can sometimes be incurred. To avoid corrosion damage, we recommend selecting a suitable material and an appropriate surface coating. The environmental conditions of the products should therefore always be taken into account during planning in addition to their intended use to ensure that the relevant corrosion protection classes are adhered to.

Table 1: Atmospheric corrosivity categories and examples of typical environments

Corrosivity category	Mass loss/thickness loss per unit surface area (after first year of exposure)				Examples of typical environments (for information purposes only)	
	Unalloyed steel		Zinc		Exterior	Interior
	Mass loss g/m ²	Thickn. loss µm	Mass loss g/m ²	Thickn. loss µm		
C1 Negligible	≤ 10	≤ 1.3	≤ 0.7	≤ 0.1	-	Heated buildings with neutral atmospheres, e.g. offices, shops, schools, hotels
C2 Low	> 10 to 200	> 1.3 to 25	> 0.7 to 5	> 0.1 to 0.7	Atmospheres with low level of pollution. Mostly rural areas	Unheated buildings where condensation may occur, e.g. warehouses, sports halls
C3 Medium	> 200 to 400	> 25 to 50	> 5 to 15	> 0.7 to 2.1	Urban and industrial atmospheres with moderate sulphur dioxide pollution; coastal atmospheres with low salinity	Production areas with high humidity and some air pollution, e.g. food processing plants, laundries, breweries, dairies
C4 High	> 400 to 650	> 50 to 80	> 15 to 30	> 2.1 to 4.2	Industrial atmospheres and coastal atmospheres with moderate salinity	Chemical plants, swimming pools, coastal shipyards and boat harbours
C5 Very high	> 650 to 1,500	> 80 to 200	> 30 to 60	> 4.2 to 8.4	Industrial areas with high humidity and aggressive atmospheres, and coastal atmospheres with high salinity	Buildings or areas with almost permanent condensation and with high pollution
CX Extreme	> 1,500 to 5,500	> 200 to 700	> 60 to 180	> 8.4 to 25	Offshore areas with high salinity and industrial areas with extreme humidity and aggressive atmosphere, and subtropical and tropical atmospheres	Industrial areas with extreme humidity and aggressive atmosphere

Source: DIN EN ISO 12944-2:2018-04

Note: The loss values for the corrosivity categories are identical to the values in ISO 9223.

Conversion: 10 N corresponds to approx. 1 kg.

Surface coatings and materials

Several measures can be taken to protect components against the corrosive conditions prevailing at the place of use. When deciding on a particular cable management system, care must therefore be taken to select suitable materials and a design that ensures proper corrosion protection while also paying careful attention to the protective layers and metallic coatings.

For installations in normal environments, zinc coatings have proven themselves to be an effective corrosion inhibitor for steel. However, the protective zinc layer gets worn away by various climatic influences over time. Calculating the thickness of the zinc layer required for different environmental conditions is a question of multiplying the erosion rate by the planned service life of the system.

DIN EN ISO 12944-2:2018-04 (Table 1) provides an overview of how the corrosion categories are assigned while taking account of the environment and the associated annual thickness loss of the zinc layer.

PohlCon offers several coating systems that differ from one another in terms of layer thickness, adhesion and appearance. In addition, most of our cable management systems can be supplied as stainless steel versions.

Alternatively, the PUK brand XC Duplex Coating System can be used for highly corrosive environments (corrosion category C5). The XC coating has been successfully tested in accordance with the DIN EN ISO 12944-6 standard and offers great flexibility with regard to use. With its specially developed formula, it provides a smooth, bubble-free and even coating surface.

Zinc electroplating (DIN EN ISO 4042)

The components to be coated are placed in an electrolytic bath, where zinc ions are deposited very evenly on the material being galvanised. This results in the formation of a bright and shiny zinc layer with a thickness of approximately 5 µm. To protect this layer against abrasion, it subsequently undergoes bichromate coating process. Within our product range, the relevant bolting fasteners/bolts and nuts are identified by the code **GV**. These are used to connect components galvanised using the sendzimir process.

Hot galvanisation according to the Sendzimir process (DIN EN 10346, DIN EN 10244-2)

In the rolling mill itself, a wide strip (sheet thickness ≤ 2.0 mm) is coated with zinc continuously as it passes through. This results in an even and strongly adhering zinc layer with an average thickness of 19 µm. Damage to the zinc layer by cutting, piercing/perforation, drilling, etc. does not lead to any progression of the corrosion because the adjacent zinc forms into solution due to the effect of (air) humidity, causing a brownish layer of protective zinc hydroxide to form on the bare cut surfaces. The "migration" of zinc ions protects exposed surfaces up to a width of approximately 2.0 mm. Steel wire and wire products are galvanised in accordance with DIN EN 10244-2.

Products with this type of coating are identified by the code **S**.

Batch galvanisation (DIN EN ISO 1461)

Hot-dip galvanisation (DIN EN ISO 1461)

Once they have been worked, the parts that are to be coated are immersed in molten zinc (approx. 450°C). Chemical reactions create various zinc-iron alloys that have a particularly strong bond with the steel core. These alloys are usually coated with a "pure zinc" layer. However, depending on the reaction rate, composition of the steel, immersion time, cooling process, etc., the zinc-iron alloys can run right through to the surface level due to a sort of "marbling" effect. For this reason, the surface appearance can vary from bright and shiny through to matt dark grey, although nothing can be inferred about the thickness of the zinc layer or the quality of corrosion protection from this. In addition, humid environments lead to the formation of zinc hydroxide carbonate (known as white rust), particularly on new zinc surfaces. This has absolutely no impact on the corrosion protection properties. Cut surfaces have to be protected with cold zinc paint.

According to DIN EN ISO 1461, the average layer thickness is

at least the following for steel and non-centrifuged parts:

- 45 µm for material thicknesses <1.5 mm
- 55 µm for material thicknesses ≥ 1.5 mm and ≤ 3 mm
- 70 µm for material thicknesses > 3 mm and ≤ 6 mm

at least the following for centrifuged parts (incl. castings):

- 45 µm for material thicknesses <3 mm
- 55 µm for material thicknesses ≥ 3 mm

DIN EN ISO 1461 essentially corresponds to BS EN ISO 1461 in the UK, to EN ISO 1461 in France and to NEN EN 1461 in the USA. All cable tray types and all medium to heavy-duty support systems are available in a hot-dip galvanised version.

Products with this type of coating are identified by the code **F**.

Stainless steel

In view of its high corrosion resistance, ease of surface cleaning, recyclability and reaction to fire, stainless steel is increasingly becoming the material of choice. Its use is predominantly on the rise in the chemicals, paper, textile and food industries, as well as in wastewater treatment plants, refineries, vehicle tunnels and offshore plants. Compared to various types of plastic, the advantages of stainless steel are its high strength, temperature and fire resistance, and the fact that it does not produce any emissions in the event of fire or during machining.

PohlCon offers two stainless steel versions of its cable management systems as standard.

The most commonly used type is material no. 1.4301 (V2A), which has the short designation X5CrNi 18-10 according to EN 10088-2. It is approved by the Deutsches Institut für Bautechnik (DIBt) in Berlin under general technical approval Z-30.3-6. The following standards are related:

- EN 10088-2 1.4301 X5CrNi 18-10
- AISI 304
- UNS S 30400
- BS 304 S31
- AFNOR Z7CN 18-09
- DIN 17441

PohlCon offers a complete range of stainless steel products: bracket supports, brackets, cable trays, cable ladders, vertical ladders, profile rails and cable clamps. The bolting fasteners/ bolts and nuts correspond to steel group A2 (according to DIN ISO 3506). The products made from this material are identified by the code **E**.

On request, products from the stainless steel range are also available in versions made from the material with no. 1.4571/1.4404 (V4A), which has the short designation X6CrNiMoTi17-12-2 according to EN 10088-2. This is likewise approved by the Deutsche Institut für Bautechnik (DIBt) in Berlin. The bolting fasteners/bolts and nuts meet the requirements of steel group A4 (according to DIN ISO 3506). This material is referred to in the following standards:

- EN 10088-3 1.4404 X2CrNiMo 17-12-2
- AISI 316 L
- UN S 31603
- BS 316 S 11
- AFNOR Z3CND17-11-02/ Z3CND 17-12-02
- DIN 17440 1.4404

1.4571 is available as an alternative to this material. This type of steel is identified by the code **E4**.

Other materials with the same corrosion class can be supplied on request. To cater for special applications (lighting and cable support systems in road tunnels according to ZTV-ING), the high-alloy stainless steel with material no. 1.4529 is available for the relevant product versions.

XC coating for highly corrosive environments

The XC Duplex Coating System enables reliable protection in highly corrosive environments. With its XC system – which has been successfully tested for corrosion category C5-M – PohlCon offers the longest lasting corrosion protection (up to 25 years) for cable management systems available on the market.

XC consists of a zinc layer and a single-layer powder coating, which together adhere extremely well to the component. With powder coating thicknesses starting from 150 µm and zinc layer thicknesses from 55 µm, XC can be used to achieve an exceptionally smooth and even surface that is free of bubbles. In the event that it should become damaged, the XC coating can be touched up in the case of (more extensive) damage.

We recommend the use of XC coatings in offshore areas with high salinity, in industrial zones with extreme air humidity and in aggressive, subtropical and tropical atmospheres.

Calculations for selecting the right system

Selecting a vertical ladder

To be selected on the basis of:

1. The fastening method to be used on site (e.g. fastening to the wall, fastening to the floor and ceiling (free-standing installation), or fastening to the wall and ceiling)
2. The number of cables to be carried by a vertical ladder (width of vertical ladder)
3. The weight of the cables (type of vertical ladder)

Fastening methods

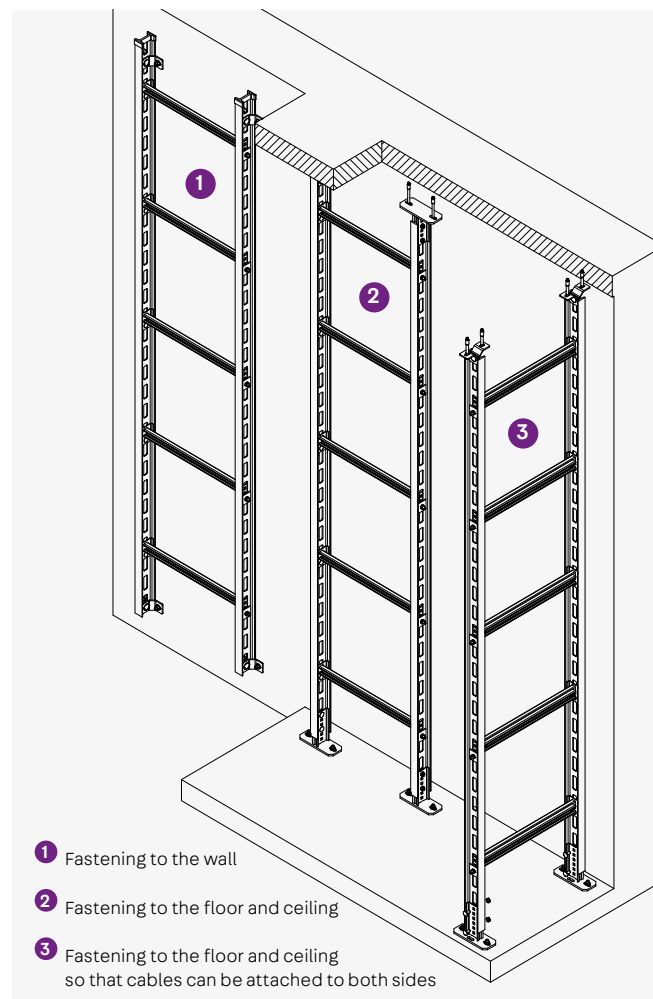
Fastening to the wall

The vertical ladder can be fastened to the wall (not as a free-standing installation). The distance between the fastening elements (e.g. angle brackets) must be less than the height of the room, e.g. a maximum of 1500 mm in the case of the STU 50. Suitable fastening components must be used to secure the ladder.

Fastening to the floor and ceiling

The vertical ladder can be fastened to the floor and ceiling (as a free-standing installation). The distance between the fastening elements must be equal to the height of the room, e.g. a maximum of 6000 mm in the case of the ST 81. Head and base plates must be used to secure the ladder.

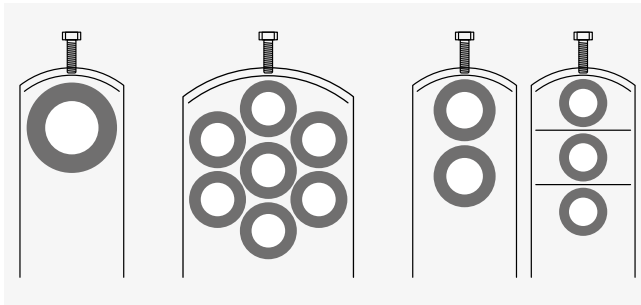
The versions for attaching cables to both sides – e.g. the STU 62 and ST 82 – are fastened to the floor and ceiling using a special method.



Fastening methods

Selecting the width of the vertical ladder

The width of the vertical ladder must be selected according to the number of cables to be laid and the laying method used (whether cables are laid individually or in bundles, or whether multiple cables are laid in clamps).



Individual cable

Cable bundle

Multiple cables

Example for an individual cable

Given data

- Individual cable
- Cable type NYY 4 x 35 with an outer diameter of 31.0 mm (as per the technical data table for type NYY; see below)
- Quantity: 10 pcs.

Data being sought

Space required $\hat{=}$ vertical ladder width to be selected

Solution

A cable diameter of 31.0 mm requires a clamp diameter range of 28 to 32 mm. This corresponds to a size 32 clamp according to the clamp technical data.

Size 32 clamp = width of 37 mm

37 mm * 10 pcs. = 370 mm of space required

When 370 mm of space is required, the width of the vertical ladder has to be **400 mm**.

(See technical data table for the vertical ladders)

Technical data for type NYY

NY Y cable	Diameter mm	Space required per cable cm ² (approx.)	Cable weight N/m (approx.)	Number of cables
4 x 1.5	12.5	1.5	2.3	n
4 x 2.5	14.0	1.8	3.0	n
4 x 6	16.5	3.0	5.2	n
4 x 16	22.0	5.0	11.0	n
4 x 35	31.0	12.0	22.0	n
4 x 70	41.0	16.0	41.0	n

Conversion: 10 N corresponds to approx. 1 kg.

Selecting the type of vertical ladder

The type of vertical ladder must be selected according to the load that will be exerted on the rungs by the cables (i.e. the weight).

The maximum permissible loads (P_{max}) for the vertical ladders are as follows:

- LGG 60 = 1.5 kN
- STU 50, STU 60 = 2.0 kN
- ST 81 = 2.5 kN
- STU 62 = 4.0 kN
- ST 82 = 5.0 kN

Technical data for the vertical ladders using the LGG 60 as an example

Type	H mm	W mm	L mm	P _{max} kN	Wt _S kg	Wt _F kg
LGG 60-20	60	200	6000	1.50	15.84	16.95
LGG 60-30	60	300	6000	1.50	17.22	18.42
LGG 60-40	60	400	6000	1.50	18.59	19.89
LGG 60-50	60	500	6000	1.50	19.96	21.36
LGG 60-60	60	600	6000	1.50	21.34	22.83

H: Height | W: Width | L: Length | P_{max}: Maximum rung point load | Wt: Weight

Example of how to select the type of vertical ladder

Given data

- Wall installation (rung spacing 300 mm = 0.3 m)
- Individual cable
- Cable type NYY 4 x 35 with a weight of 22.0 N/m (as per the technical data table for type NYY; see below)
- Quantity: 10 pcs.

Data being sought

Rung profile $\hat{=}$ vertical ladder type

Solution

$$22 \text{ N/m} * 10 * 0.3 \text{ m} = 66 \text{ N} = 0.07 \text{ kN}$$

$$\text{LGG 60-40} = 1.5 \text{ kN} \geq 0.07 \text{ kN}$$

Assuming a rung load of 0.07 kN and a necessary width of 400 mm, the **LGG 60-40** is suitable for wall installation with a maximum rung load of 1.5 kN.

Useful information

Application of loads to the building structure

All stated load-bearing capacities relate to the product concerned. The load-bearing capacity of the installed system depends on the dimensions and materials used in each case and, in particular, on how the load is applied to the building structure. Substantial additional loads can occur when installing cables. Care must be taken to prevent these additional loads from being permanently applied to the cable management system.

Substrate

The condition and properties of the substrate and the type of wall or ceiling have a major impact on the fastening of support systems. To enable a better assessment of concealed, plastered or painted substrates, it is helpful to carry out sample drilling.

This will enable you to attach the cable trays to any of the following using the appropriate support systems: timber, mortar, sandstone, limestone, concrete, solid brick, perforated brick, aerated concrete, wallboard, gypsum board, gypsum fibreboard and insulating board. Within this context, special attention must be paid to the dowels because they transmit the loads further into the substrate.

Permissible dowel load F_{Zul}

The dowel load is a superposition of vectors that represent various force components acting on the fastening point (e.g. shear force and vertical pull-out force). This must be less than or equal to the permissible dowel load specified in the approval. This generally applies to all diagonal pull directions. The permissible dowel load depends on the anchorage (concrete grade, type of masonry brick, etc.) and stress exerted on it:

- Cracked concrete tensile zone
- Verified concrete compression zone (e.g. concrete wall, concrete supports, upper half of concrete girder).

In cases of doubt, advice must be sought from the responsible structural engineer.

Reduction

The permissible dowel load F_{Zul} must be reduced if:

- Several dowels are closer to each other than dimension a of the centre-to-centre distance.
- The distance between the dowel and an edge/corner of the building structure is less than edge distance dimension a_r .

Whenever you are planning cable management systems, it is important to remember that the filling capacity of cable trays may exceed their load-bearing capacity. You must allow sufficient reserves and, where applicable, plan using a multi-layered approach.



For detailed information, use the online expert chat service at www.pohlcon.com (only available in German) or speak to a PohlCon consulting engineer.

Testing according to DIN EN 61537

Equipotential bonding

Equipotential bonding is implemented between electrically conductive components with different levels of electrical potential. The primary purpose of this is to provide protection against electric shock but, at the same time, it protects the electrical equipment in the event of excess voltage. Over time, the effect of equipotential bonding has become ever more important in relation to electromagnetic compatibility (EMC). When electricity flows through conductors, it generates magnetic fields. Due to the large number of wiring systems installed in buildings, these can then have a negative effect on electromagnetic compatibility. Low potential differences are extremely important for ensuring that an electrical installation is electromagnetically compatible.

In the case of PUK cable management systems that are assembled using bolted connections, the equipotential bonding has been verified in accordance with DIN EN 61537. In all other cases, the equipotential bonding must be ensured by further mechanical means.

Unser Synergie-Konzept für Sie

Mit uns profitieren Sie von der gesammelten Erfahrung dreier etablierter Hersteller, die Produkte und Expertise in einem umfassenden Angebot kombinieren. Das ist das PohlCon-Synergie-Konzept.



Full-Service-Beratung

Unser weitreichendes Beraternetzwerk steht Ihnen zu allen Fragen rund um unsere Produkte vor Ort zur Verfügung. Von der Planung bis hin zur Nutzung genießen Sie die persönliche Betreuung durch unsere qualifizierten Mitarbeiterinnen und Mitarbeiter.



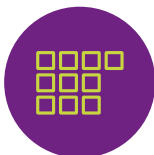
Digitale Lösungen

Unsere digitalen Angebote unterstützen Sie zielgerichtet in der Planung mit unseren Produkten. Von Ausschreibungstexten über CAD-Details und BIM-Daten bis hin zu modernen Softwarelösungen bieten wir Ihnen maßgeschneiderte Unterstützung für Ihre Planung.



7 Anwendungsfelder

Wir denken in ganzheitlichen Lösungen. Deshalb haben wir unsere Produkte für Sie in sieben Anwendungsfelder zusammengefasst, in denen Sie von der Synergie des PohlCon-Produktportfolios profitieren können.



10 Produktkategorien

Um das passende Produkt in unserem umfangreichen Sortiment noch schneller finden zu können, sind die Produkte in zehn Produktkategorien unterteilt. So können Sie zielsicher zwischen unseren Produkten navigieren.



Individuelle Sonderlösungen

Für Ihr Projekt eignet sich kein Serienprodukt auf dem Markt? Außergewöhnliche Herausforderungen meistern wir mit der langjährigen Expertise der drei Herstellermarken im Bereich individueller Lösungen. So realisieren wir gemeinsam einzigartige Bauprojekte.



All rights reserved. Reprinting and any electronic reproduction only authorised with our written permission. Errors excepted and subject to technical changes. No liability can be accepted by the publisher on any legal basis whatsoever. This publication supersedes all previous versions of the document, thereby rendering them invalid.

PohlCon GmbH

Nobelstr. 51
12057 Berlin
Germany

T +49 30 68283-04
F +49 30 68283-383

www.pohlcon.com