

Cable trays

Technical information



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Cable trays

Product description

Cable trays are the classic way of getting cables from A to B. Whether you need a perforated (RG) or unperforated (R) version, one capable of handling heavy loads (RS/RGS) or one that is suitable for use with sprinkler systems (RGL), cable trays are an easy and straightforward solution for routing cables in an organised way.

In addition to the practical benefits they offer, our cable trays can also meet high aesthetic demands thanks to the variety of surface/colour coatings and materials available. These unobtrusive, resistant and durable products can bring a touch of industrial flair to walls and ceilings in locations such as galleries, restaurants and hotels.

Available with side heights of 35 mm, 60 mm, 85 mm and 110 mm, as well as various cable tray widths, PUK's standard range can accommodate the most commonly encountered applications. Our cable trays are subject to the strictest standards of quality and are tested in accordance with DIN EN 61537 (including electrical conductivity).



Benefits

- Neat routing of cables without any sagging
- Compatible with virtually all cable types and diameters
- Efficient installation with simple hand tools
- Suitable for indoor and outdoor locations, and for use in the chemicals and food industries
- Protection against soiling, vandalism, waterlogging and heat build-up
- Easy ways of using the cable management systems to suit your individual requirements with the option of reusing them
- Can be used to maintain circuit integrity
- Customisable on request

Areas of application



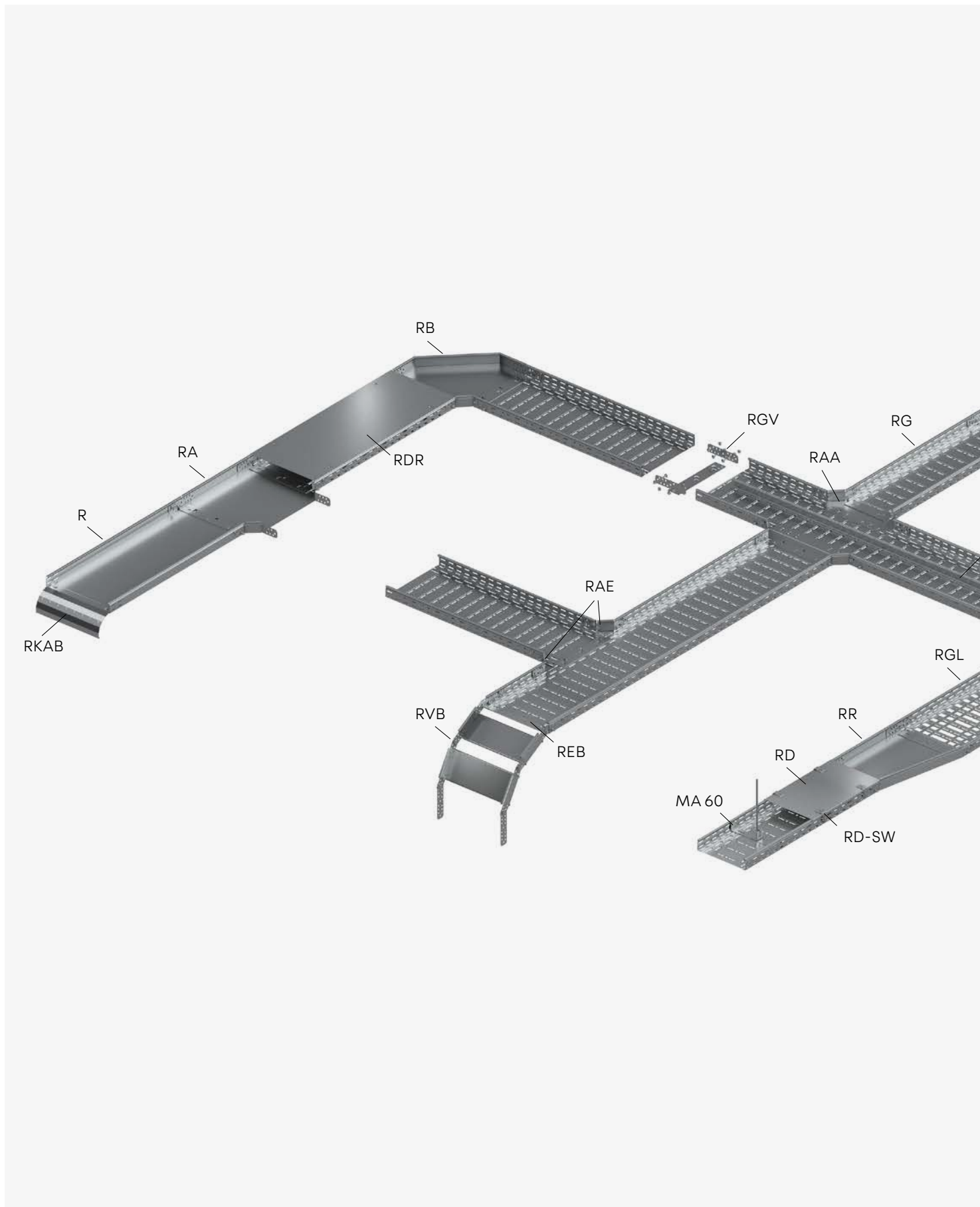
On walls and ceilings in the context of technical building equipment – indoors and outdoors



Hygienic areas, such as those encountered in the chemicals and food industries: stainless steel version (V2A)



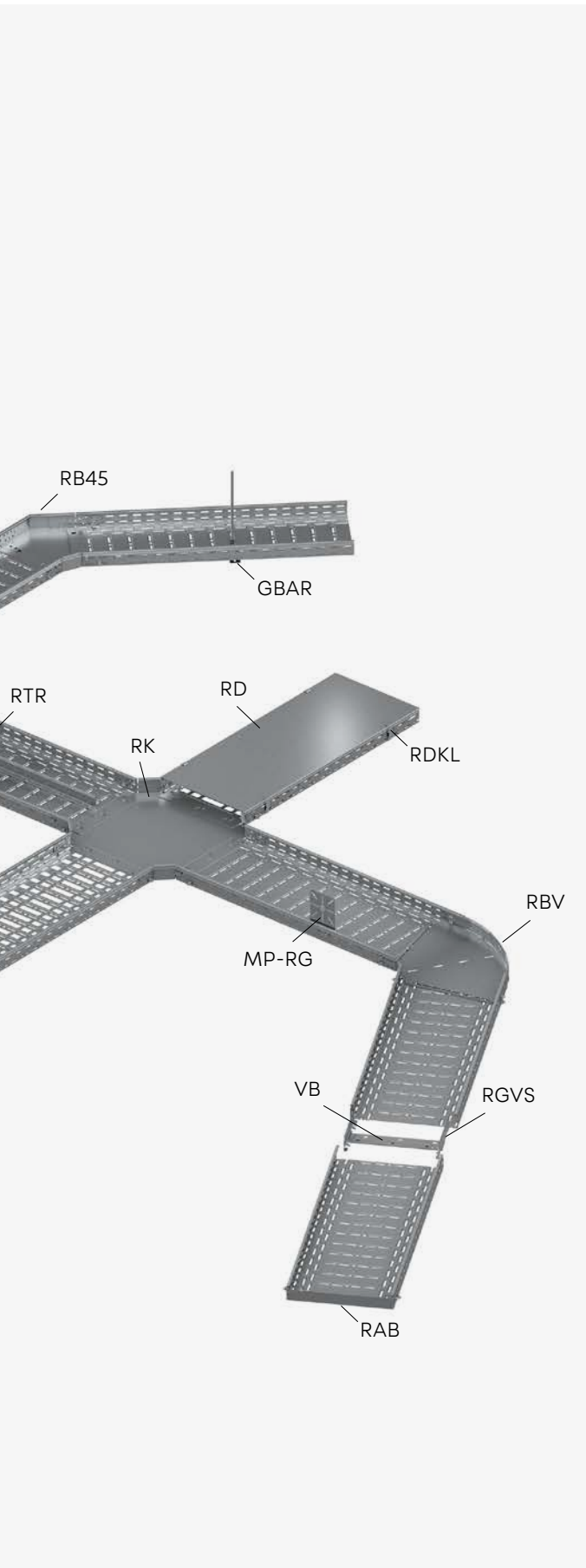
Tunnels: stainless steel version (V4A)



System overview

Cable trays enable you to route cables safely and securely. They also protect the cables themselves against dust and external influences. Cable trays can be combined with the relevant formed parts, accessories and support systems to create a complete cable management system that offers flexibility. With the aid of optional accessories, such as the RTR separating strip or the RGV tray connector, your cables can be sorted and organised or the cable tray length can be adjusted as required. Thanks to their head shape, the cable trays are really easy to combine with the RD cable tray covers, which are positive locking.

If there is a risk of significant bottom deflection, we recommend using perforated cable trays as these feature longitudinal and lateral reinforcing rims as standard, which reduce this effect.



R/RG 35

Unperforated/perforated cable tray



Product features

- Height of sides: 35 mm
- Available tray widths: 50 to 300 mm
- Length: 3,000 mm
- Cross-sectional areas of 15 to 102 cm²
- Available in unperforated (R) and perforated (RG) versions



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

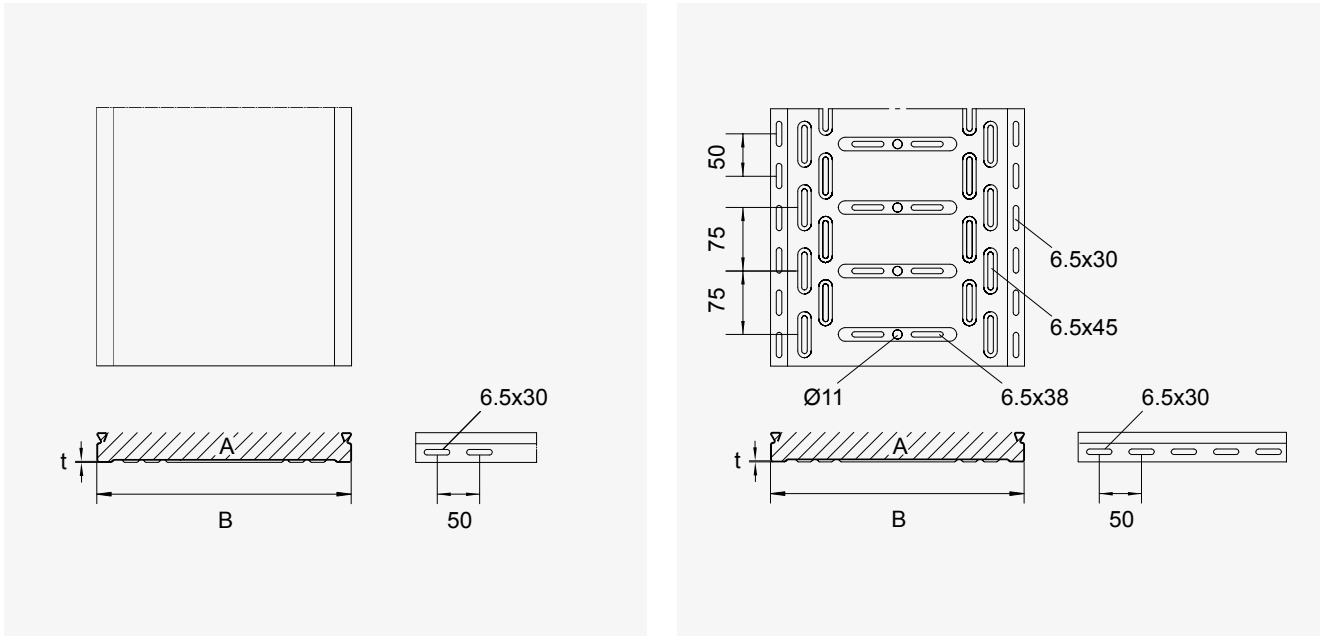


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
R 35-05	50	0.75	15	0.02	2.9	3.2
R 35-10	100	0.75	32	0.05	3.7	4.2
R 35-20	200	0.75	67	0.10	5.5	6.2
R 35-30	300	0.75	102	0.15	7.3	8.1
RG 35-05	50	0.75	15	0.02	2.6	2.9
RG 35-10	100	0.75	32	0.05	3.5	3.9
RG 35-20	200	0.75	67	0.10	5.0	5.6
RG 35-30	300	0.75	102	0.15	6.7	7.5

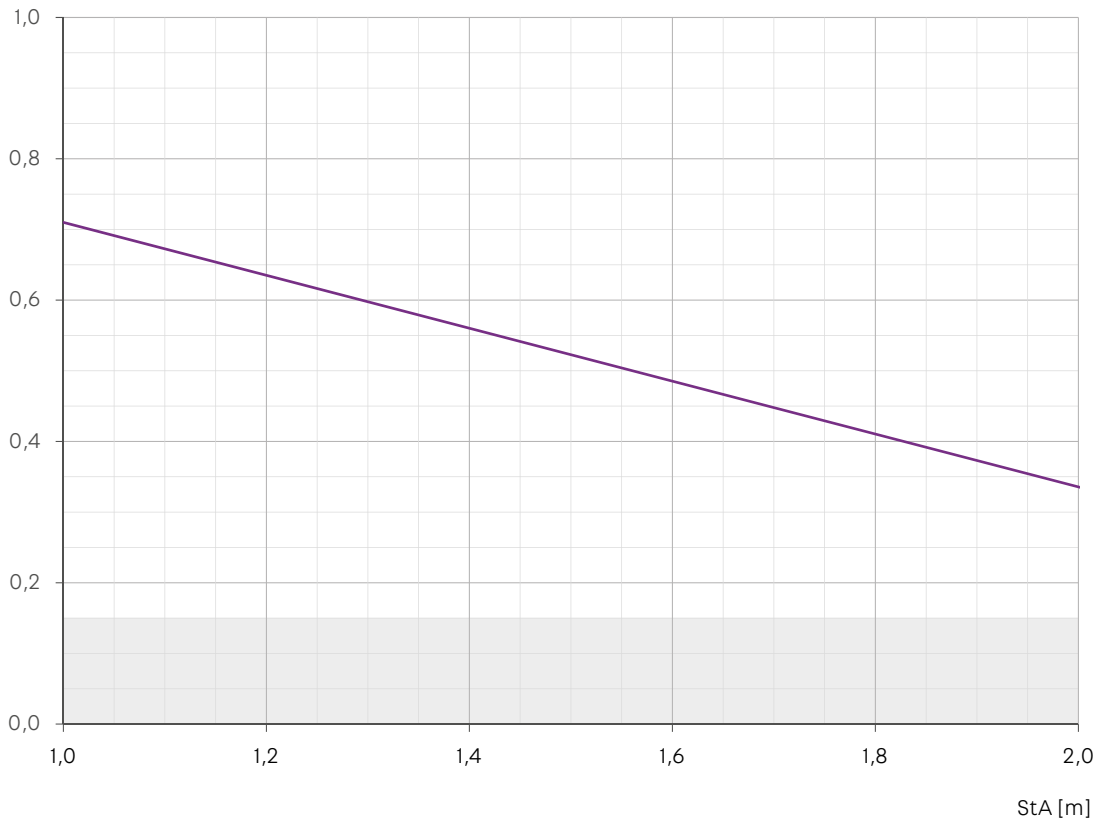
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
 Model/version: R 35-10S

Load diagram R/RG 35 **S F**

Q_{max} [kN/m]



— Tray width: 50 to 300 mm

Q_{max} : Max. distributed load

■ Filled to capacity with maximum tray width

StA: Support distance



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

R/RG 60

Unperforated/perforated cable tray



Product features

- Height of sides: 60 mm
- Available tray widths: 50 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 27 to 357 cm²
- Available in unperforated (R) and perforated (RG) versions



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

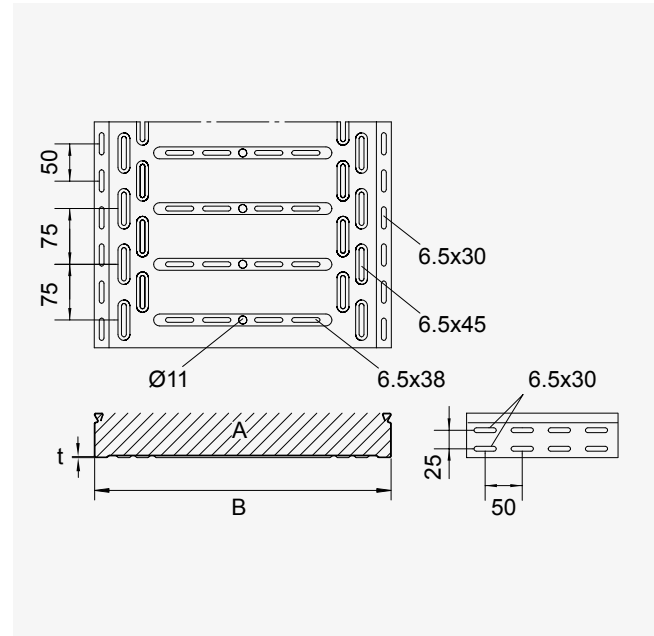
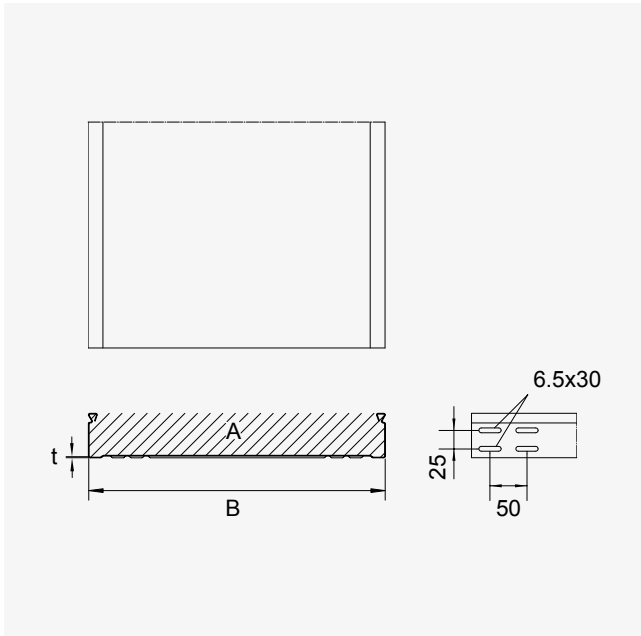


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t _{S F} mm	t _{E E4} mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg	G _E kg
R 60-05	50	0.75	-	27	0.04	3.7	4.2	-
R 60-10	100	0.75	0.80	57	0.09	4.6	5.2	4.9
R 60-20	200	0.75	0.80	117	0.18	6.4	7.1	6.8
R 60-30	300	0.75	0.80	177	0.27	8.1	9.1	8.7
R 60-40	400	0.88	0.80	237	0.36	11.6	12.8	10.6
R 60-50	500	1.00	1.00	297	0.45	15.5	16.9	15.6
R 60-60	600	1.00	1.00	357	0.54	17.9	19.5	18.0
RG 60-05	50	0.75	-	27	0.04	3.4	3.8	-
RG 60-10	100	0.75	0.80	57	0.09	4.3	4.8	4.6
RG 60-20	200	0.75	0.80	117	0.18	5.8	6.5	6.2
RG 60-30	300	0.75	0.80	177	0.27	7.4	8.3	8.0
RG 60-40	400	0.88	0.80	237	0.36	10.6	11.7	9.7
RG 60-50	500	1.00	1.00	297	0.45	14.2	15.7	14.3
RG 60-60	600	1.00	1.00	357	0.54	16.5	18.1	16.6

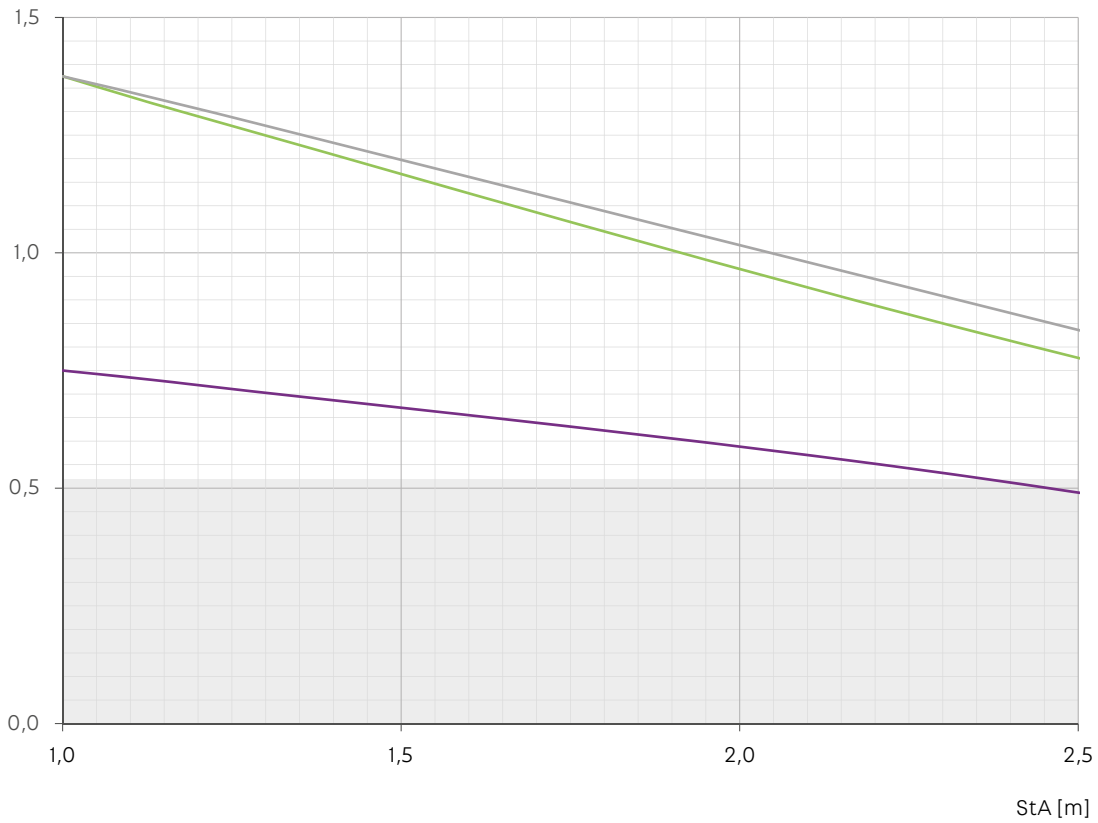
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
Model/version: R 60-10S

Load diagram R/RG 60 **S F**

Q_{max} [kN/m]



— Tray width: 50 to 300 mm

— Tray width: 400 mm

— Tray width: 500/600 mm

■ Filled to capacity with maximum tray width

Q_{max} : Max. distributed load

StA: Support distance



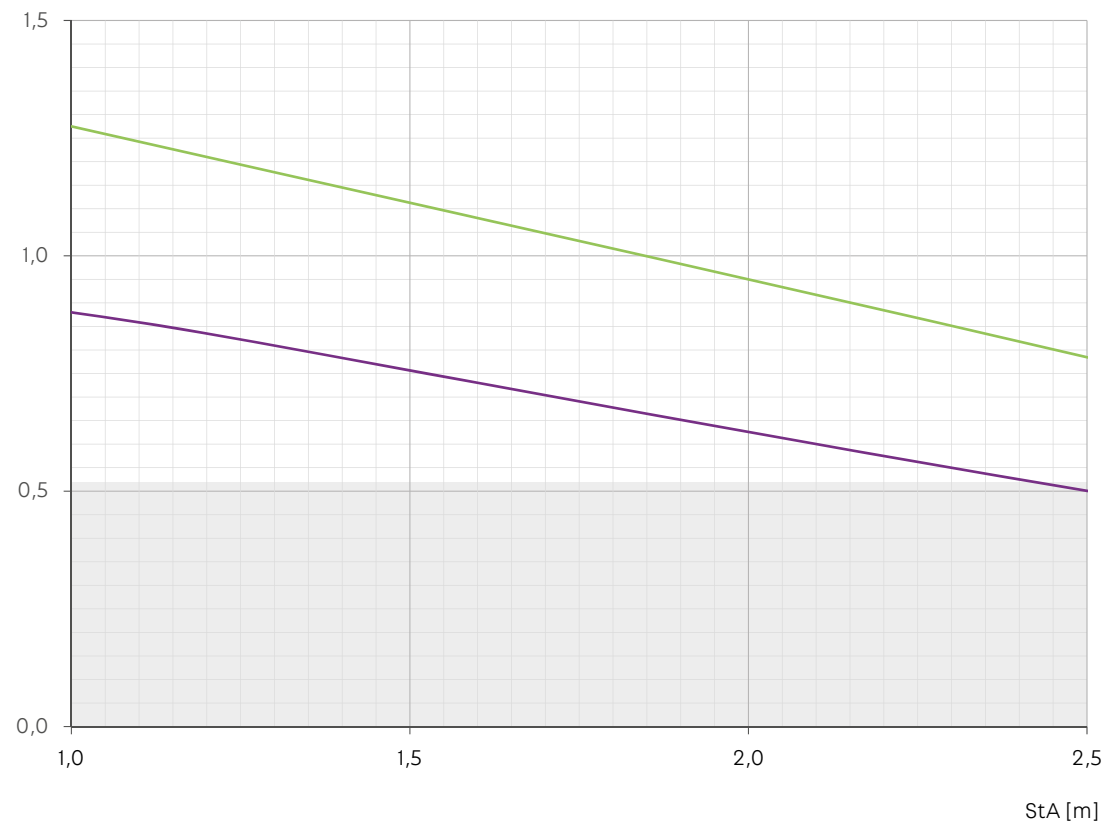
The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

Load diagram R/RG 60 **E**

Q_{max} [kN/m]



— Tray width: 100 to 400 mm

Q_{max} : Max. distributed load

— Tray width: 500/600 mm

StA: Support distance

■ Filled to capacity with maximum tray width



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

RS/RGS 60

Unperforated/perforated, heavy-duty cable tray



Product features

- Height of sides: 60 mm
- Available tray widths: 100 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 57 to 357 cm²
- Available in unperforated (RS) and perforated (RGS) versions
- Heavy-duty design for higher load levels



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

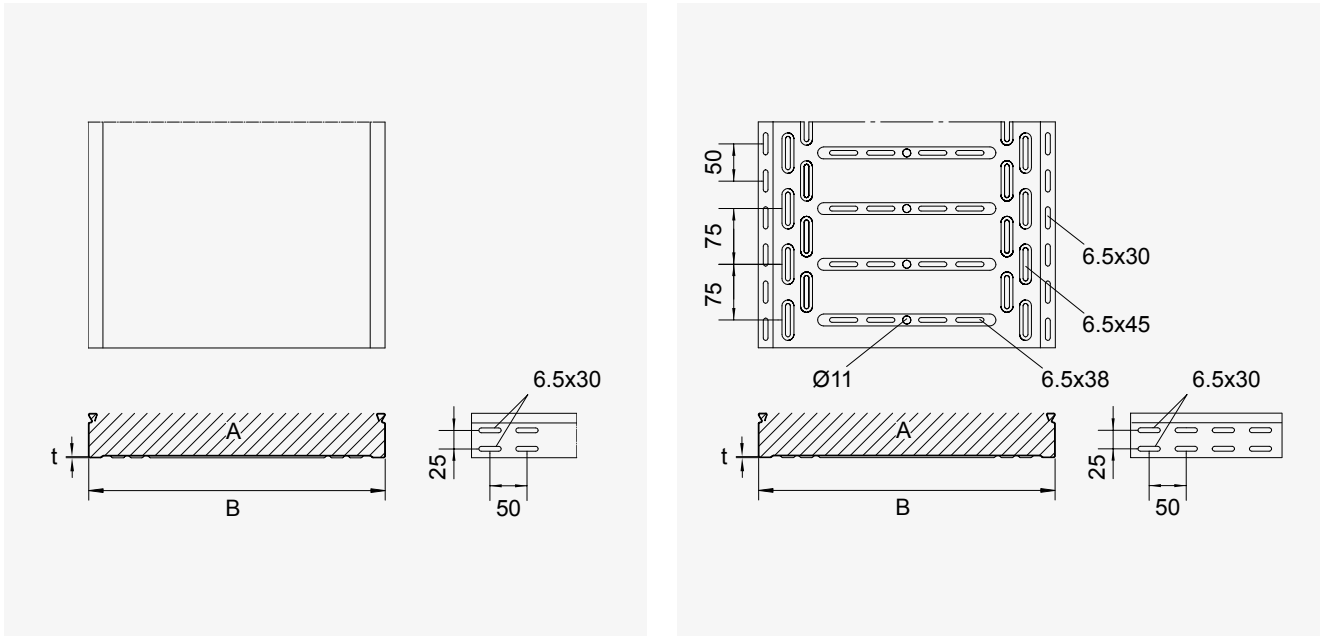


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
RS 60-10	100	1.5	57	0.09	9.0	9.6
RS 60-20	200	1.5	117	0.18	12.6	13.3
RS 60-30	300	1.5	177	0.27	16.1	17.1
RS 60-40	400	1.5	237	0.36	19.6	20.8
RS 60-50	500	1.5	297	0.45	23.2	24.6
RS 60-60	600	1.5	357	0.54	26.7	28.3
RGS 60-10	100	1.5	57	0.09	8.3	8.9
RGS 60-20	200	1.5	117	0.18	11.3	12.1
RGS 60-30	300	1.5	177	0.27	14.6	15.6
RGS 60-40	400	1.5	237	0.36	18.0	19.1
RGS 60-50	500	1.5	297	0.45	21.3	22.7
RGS 60-60	600	1.5	357	0.54	24.6	26.2

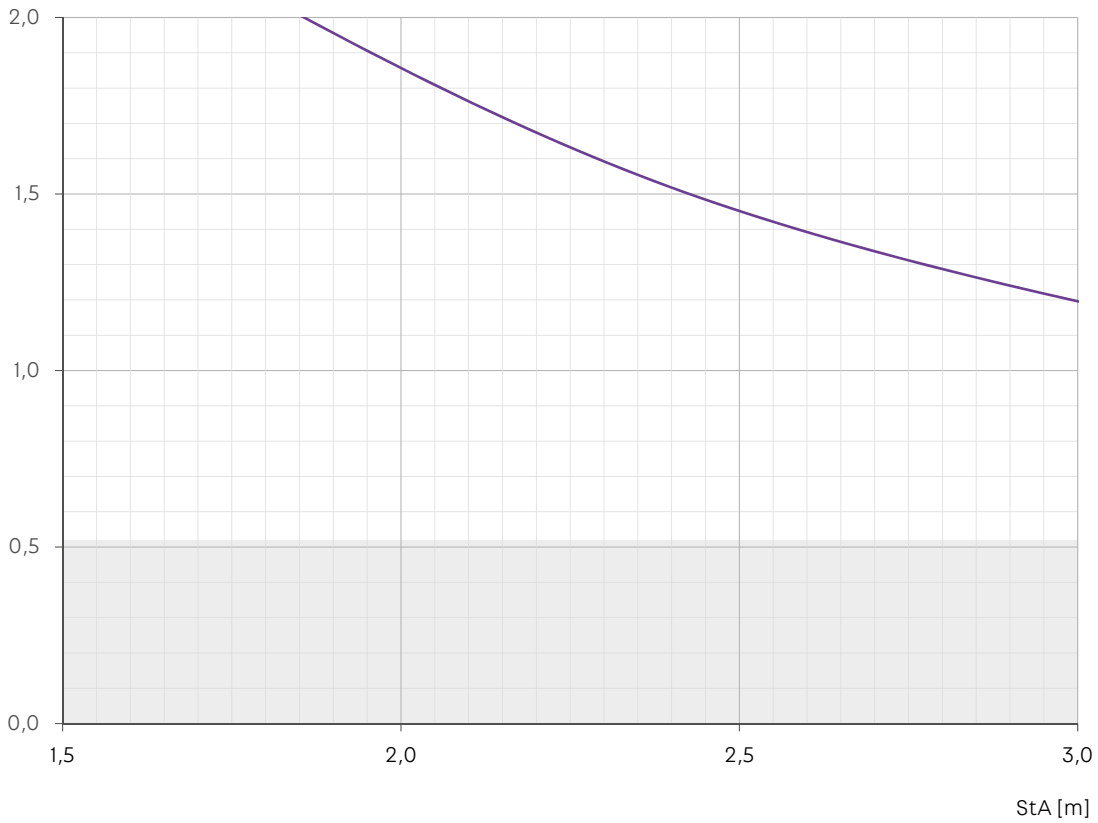
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
Model/version: RS 60-10S

Load diagram RS/RGS 60 **S F**

Q_{max} [kN/m]



— Tray width: 100 to 600 mm

Q_{max} : Max. distributed load

■ Filled to capacity with maximum tray width

StA: Support distance



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

RGL 60

Perforated cable tray permeable to extinguishing water



Product features

- Height of sides: 60 mm
- Available tray widths: 200 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 117 to 357 cm²
- Water-permeable cable tray system with 30% holes for use underneath sprinkler systems in accordance with VdS guideline 2092



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

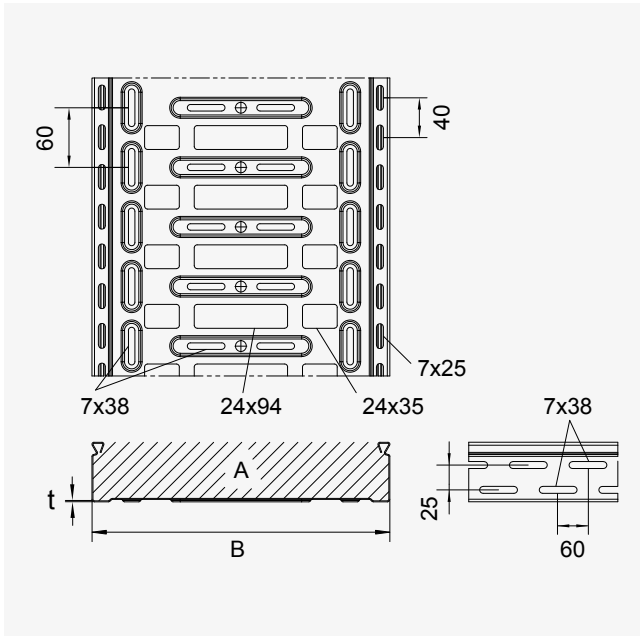


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
RGL 60-20	200	0.75	117	0.18	5.1	5.7
RGL 60-30	300	0.75	177	0.27	6.2	7.0
RGL 60-40	400	0.88	237	0.36	8.6	9.5
RGL 60-50	500	1.00	297	0.45	11.3	12.4
RGL 60-60	600	1.00	357	0.54	12.8	14.0

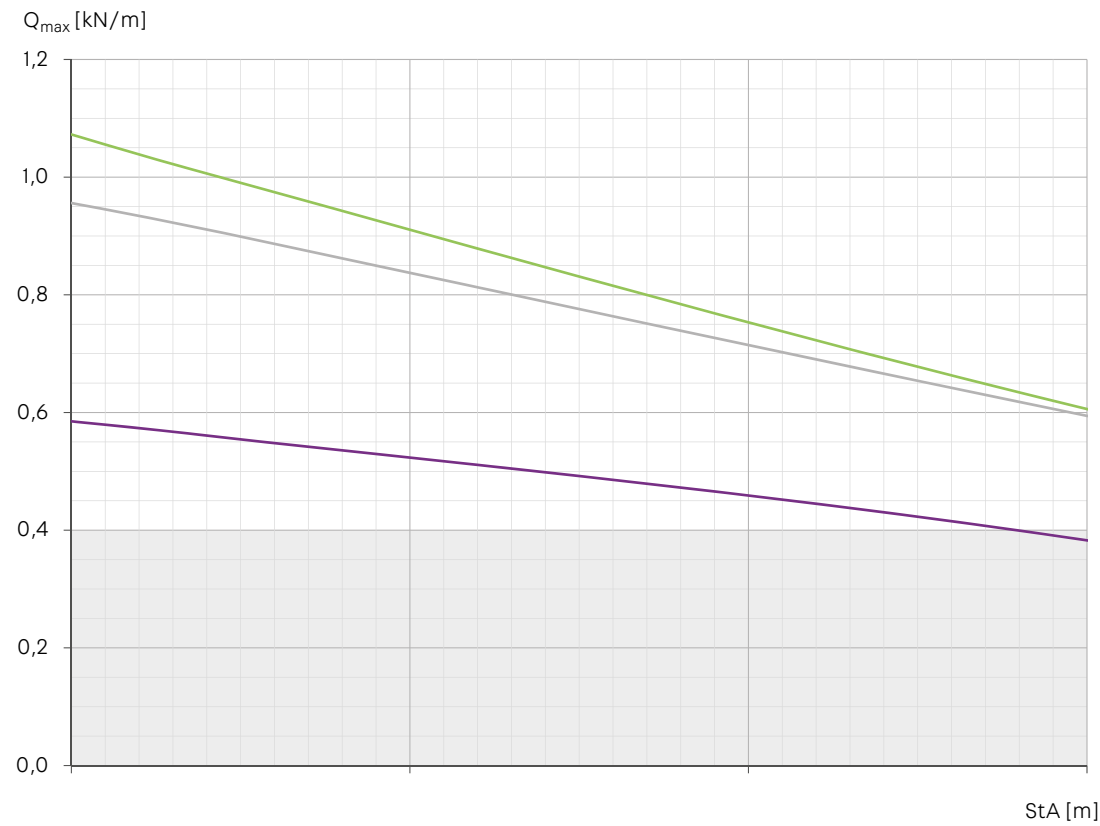
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
 Model/version: RGL 60-20S

Load diagram RGL 60 S F

Q_{max} [kN/m]



Tray width: 200/300 mm

Tray width: 400 mm

Tray width: 500/600 mm

Filled to capacity with maximum tray width

Q_{max} : Max. distributed load

StA: Support distance



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.

R/RG 85

Unperforated/perforated cable tray



Product features

- Height of sides: 85 mm
- Available tray widths: 100 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 82 to 507 cm²
- Available in unperforated (R) and perforated (RG) versions



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

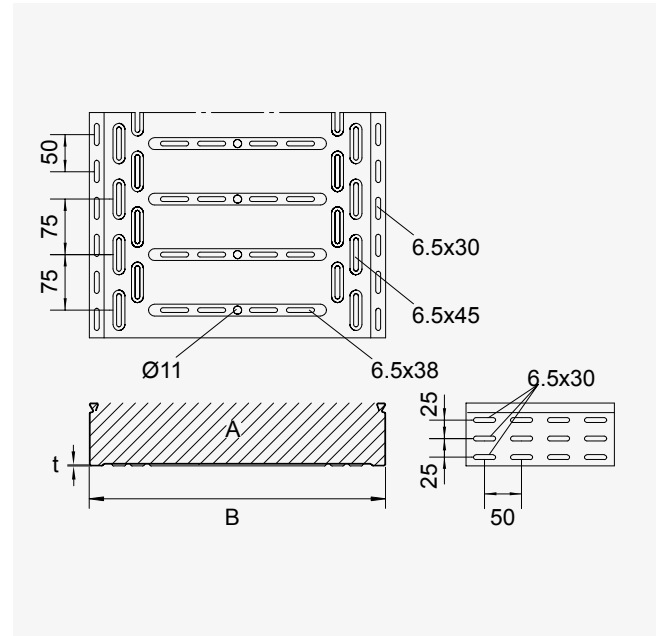
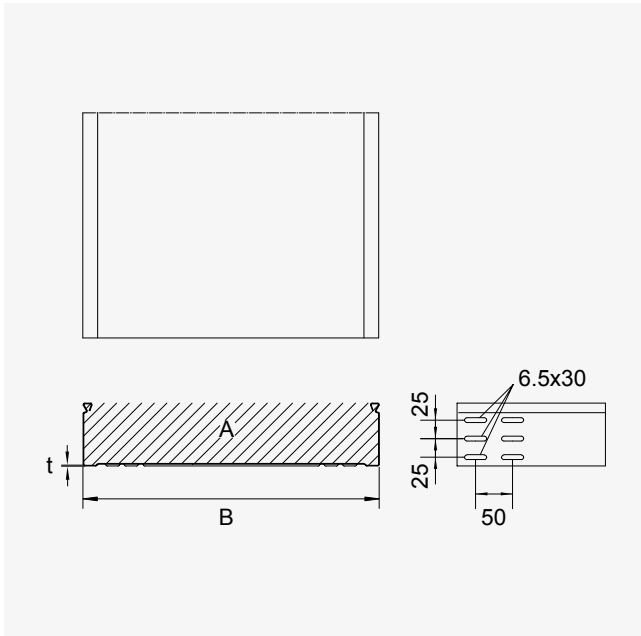


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
R 85-10	100	0.75	82	0.12	5.5	6.1
R 85-20	200	0.75	167	0.25	7.2	8.1
R 85-30	300	0.88	252	0.38	10.6	11.6
R 85-40	400	0.88	337	0.51	12.6	13.9
R 85-50	500	1.00	422	0.63	16.7	18.2
R 85-60	600	1.00	507	0.76	19.0	20.8
RG 85-10	100	0.75	82	0.12	5.0	5.7
RG 85-20	200	0.75	167	0.25	6.5	7.3
RG 85-30	300	0.88	252	0.38	9.6	10.5
RG 85-40	400	0.88	337	0.51	11.5	12.7
RG 85-50	500	1.00	422	0.63	15.2	16.8
RG 85-60	600	1.00	507	0.76	17.5	19.2

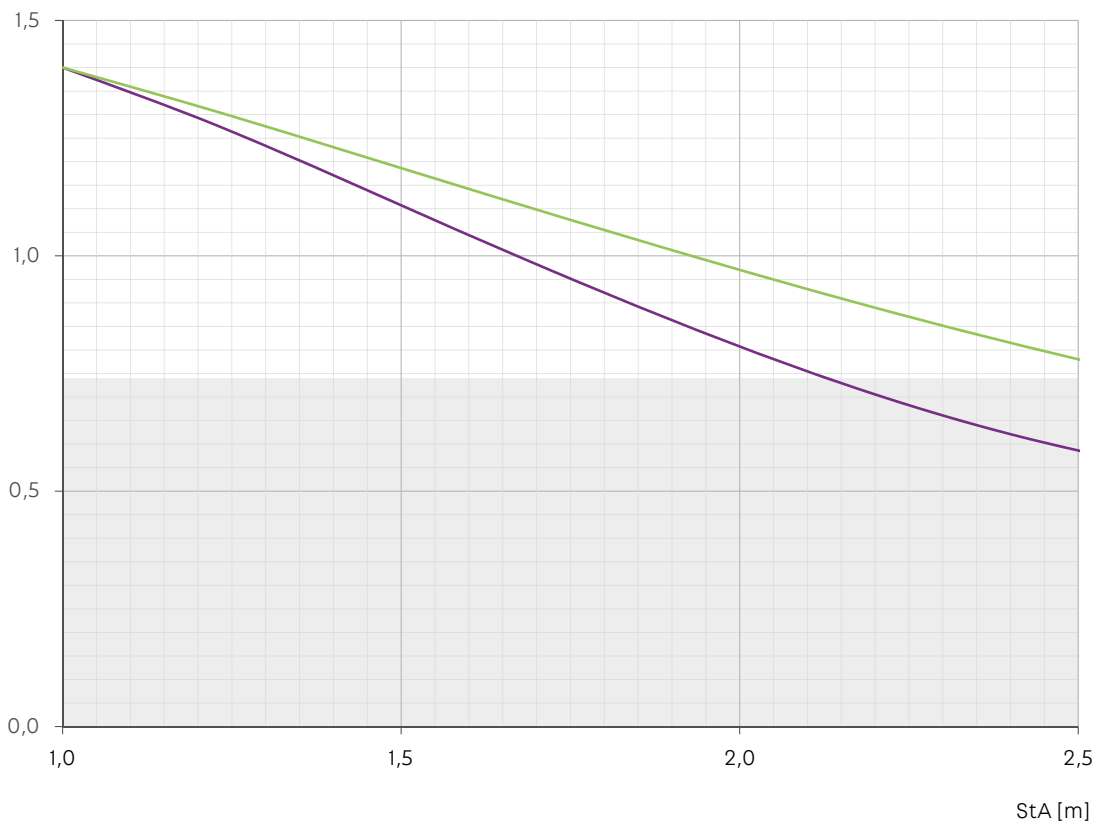
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
Model/version: R 85-10S

Load diagram R/RG 85 **S F**

Q_{max} [kN/m]



— Tray width: 100/200 mm

— Tray width: 300 to 600 mm

■ Filled to capacity with maximum tray width

Q_{max} : Max. distributed load

StA: Support distance



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

RGS 85

Perforated, heavy-duty cable tray



Product features

- Height of sides: 85 mm
- Available tray widths: 100 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 82 to 507 cm²
- Heavy-duty design for higher load levels



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.



Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

R/RG 110

Unperforated/perforated cable tray



Product features

- Height of sides: 110 mm
- Available tray widths: 100 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 107 to 657 cm²
- Available in unperforated (R) and perforated (RG) versions



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

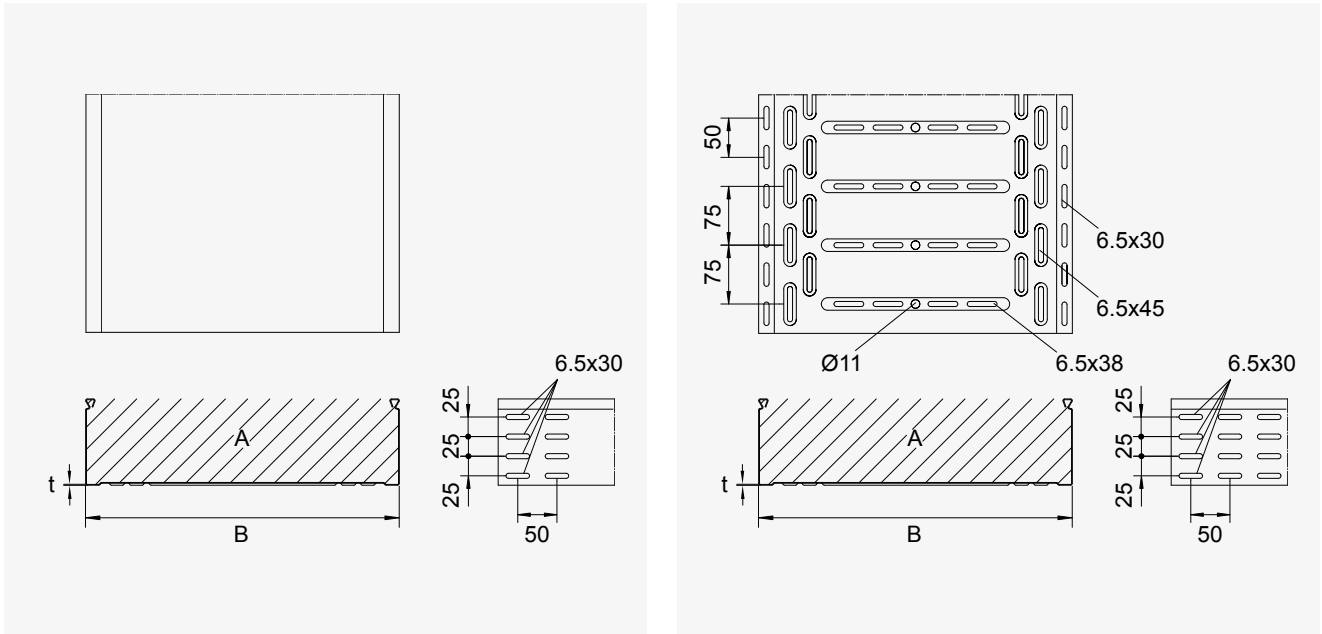


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t _S F mm	t _E mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg	G _E kg
R 110-10	100	0.75	0.80	107	0.16	6.3	7.1	6.8
R 110-20	200	0.75	0.80	217	0.33	8.1	9.1	8.7
R 110-30	300	0.88	0.80	327	0.49	11.6	12.8	10.6
R 110-40	400	1.00	1.00	437	0.66	15.5	16.9	15.6
R 110-50	500	1.00	1.00	547	0.82	17.8	19.5	17.9
R 110-60	600	1.00	1.00	657	0.99	20.2	22.0	20.3
RG 110-10	100	0.75	0.80	107	0.16	5.8	6.5	6.2
RG 110-20	200	0.75	0.80	217	0.33	7.3	8.1	7.8
RG 110-30	300	0.88	0.80	327	0.49	10.4	11.5	9.6
RG 110-40	400	1.00	1.00	437	0.66	14.0	15.4	14.1
RG 110-50	500	1.00	1.00	547	0.82	16.3	17.9	16.4
RG 110-60	600	1.00	1.00	657	0.99	18.5	20.3	18.6

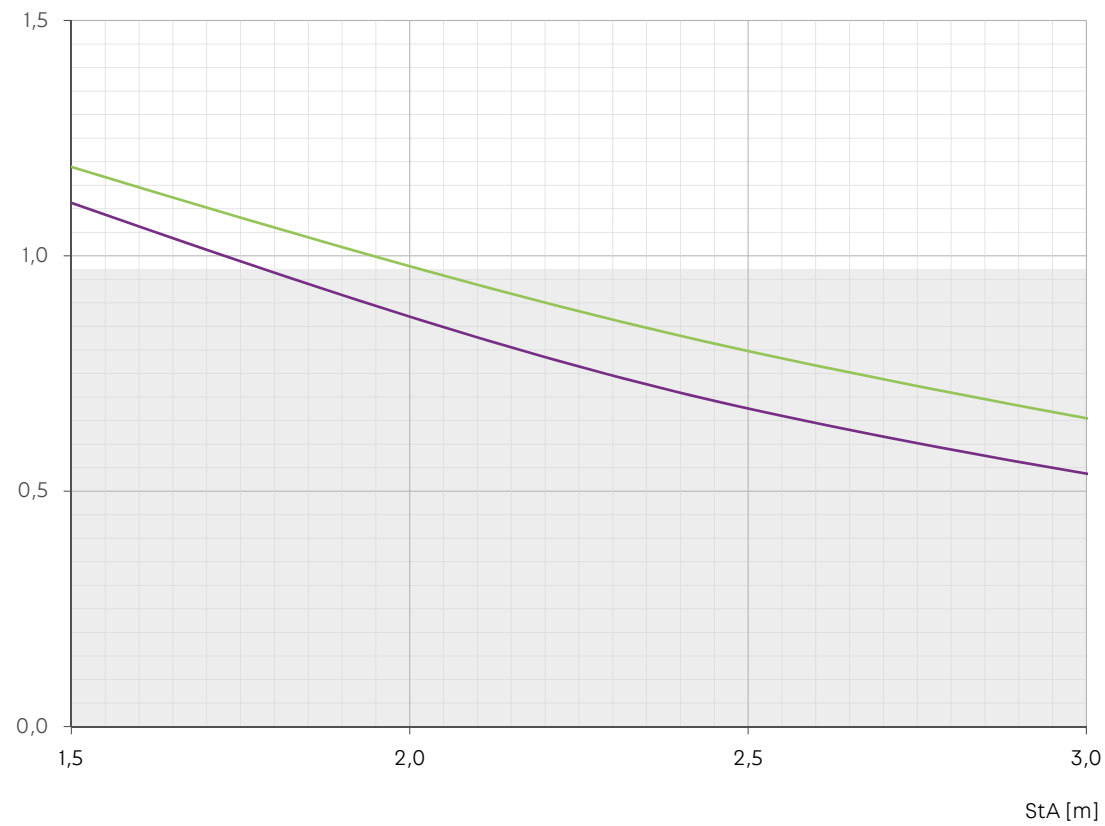
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
Model/version: R 110-10S

Load diagram R/RG 110 **S F E**

Q_{max} [kN/m]



— Tray width: 100/200/300 mm

Q_{max} : Max. distributed load

— Tray width: 400/500/600 mm

StA: Support distance

■ Filled to capacity with maximum tray width



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

RS/RGS 110

Unperforated/perforated, heavy-duty cable tray



Product features

- Height of sides: 110 mm
- Available tray widths: 100 to 600 mm
- Length: 3,000 mm
- Cross-sectional areas of 107 to 657 cm²
- Available in unperforated (R) and perforated (RG) versions
- Heavy-duty design for higher load levels



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

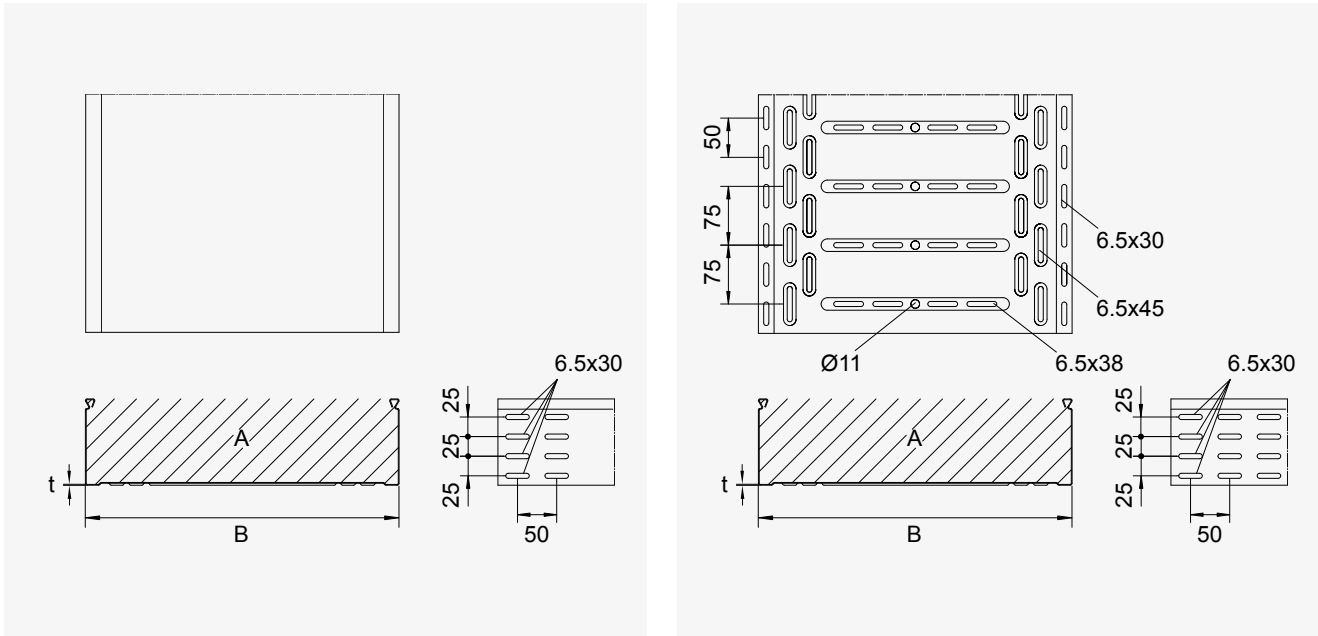


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
RS 110-10	100	1.5	107	0.16	12.6	13.3
RS 110-20	200	1.5	217	0.33	16.0	17.0
RS 110-30	300	1.5	327	0.49	19.6	20.8
RS 110-40	400	1.5	437	0.66	23.1	24.5
RS 110-50	500	1.5	547	0.82	26.6	28.2
RS 110-60	600	1.5	657	0.99	30.2	32.0
RGS 110-10	100	1.5	107	0.16	11.3	12.1
RGS 110-20	200	1.5	217	0.33	14.3	15.3
RGS 110-30	300	1.5	327	0.49	17.7	18.8
RGS 110-40	400	1.5	437	0.66	21.0	22.4
RGS 110-50	500	1.5	547	0.82	24.3	25.9
RGS 110-60	600	1.5	657	0.99	27.6	29.4

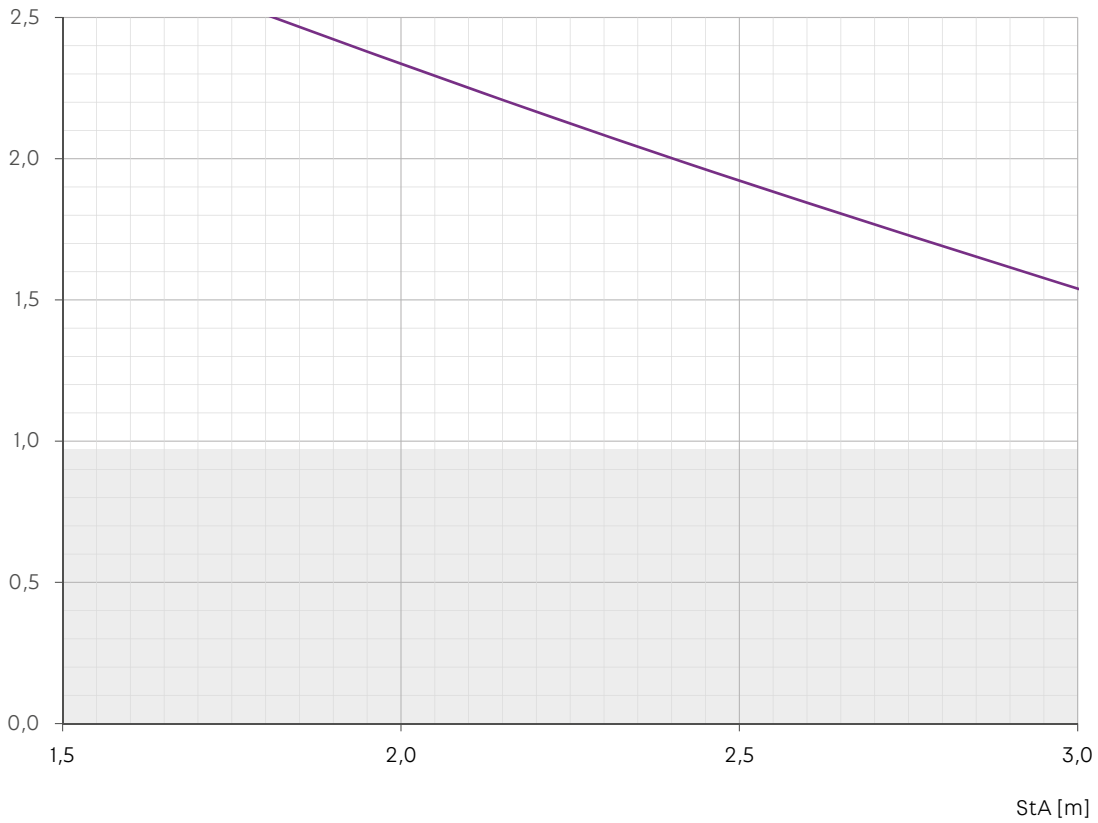
B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
Model/version: RS 110-10S

Load diagram RS/RGS 110 **S F**

Q_{max} [kN/m]



— Tray width: 100 to 600 mm

Q_{max} : Max. distributed load

■ Filled to capacity with maximum tray width

StA: Support distance



The filling capacity of cable trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

Formed parts, covers and installation components



Formed parts with integrated connectors.



Covers are positive locking.



RB 35/60/85/110
90° cable tray bend



RB45 35/60/85/110
45° cable tray bend



RBV 35/60/85
Variable 90° cable tray bend



RAE 35/60/85/110
Cable tray attachment corner



RAA 35/60/85/110
Cable tray attachment branch



RA 35/60/85/110
Cable tray branch



RK 35/60/85/110
Cable tray crossing



RVB 35/60/85/110
Variable cable tray vertical bend



RR 35/60/85/110
Cable tray reducer



RD
Cable tray cover



RDR
Cable tray cover with turning bolts



RDS
Heavy-duty cable tray cover



RDSR
Heavy-duty cable tray cover
with turning bolts



RBD
90° cable tray bend cover



RBDR
90° cable tray bend cover
with turning bolts



RBD45
45° cable tray bend cover



RBDR45
45° cable tray bend cover
with turning bolts



RBVD
Variable cable tray bend
cover



RBVDR
Variable cable tray bend
cover with turning bolts



RAED
Cable tray attachment corner
cover



RAAD
Cable tray attachment
branch cover



RAADR
Cable tray attachment
branch cover with turning
bolts



RAD
Cable tray branch cover



RADR
Cable tray branch cover
with turning bolts



RKD
Cable tray crossing cover



RKDR
Cable tray crossing cover
with turning bolts



RRD
Cable tray reducer cover



RRDR
Cable tray reducer cover
with turning bolts



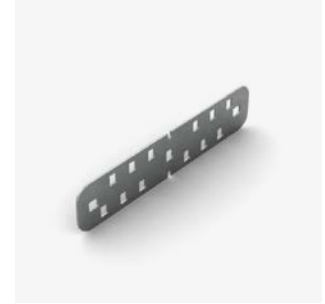
RD-SW
Storm protection angle



RDKL 60/110
Cable tray cover clamp



RAB 35/60/85/110
Cable tray closing panel



RGV 35/60/85/110
Cable tray connector



RGVS
Cable tray side snap connector



VB
Connection plate



REB
Cable tray end-plate



RTR
Cable tray separating strip



MP-RG
Assembly plate

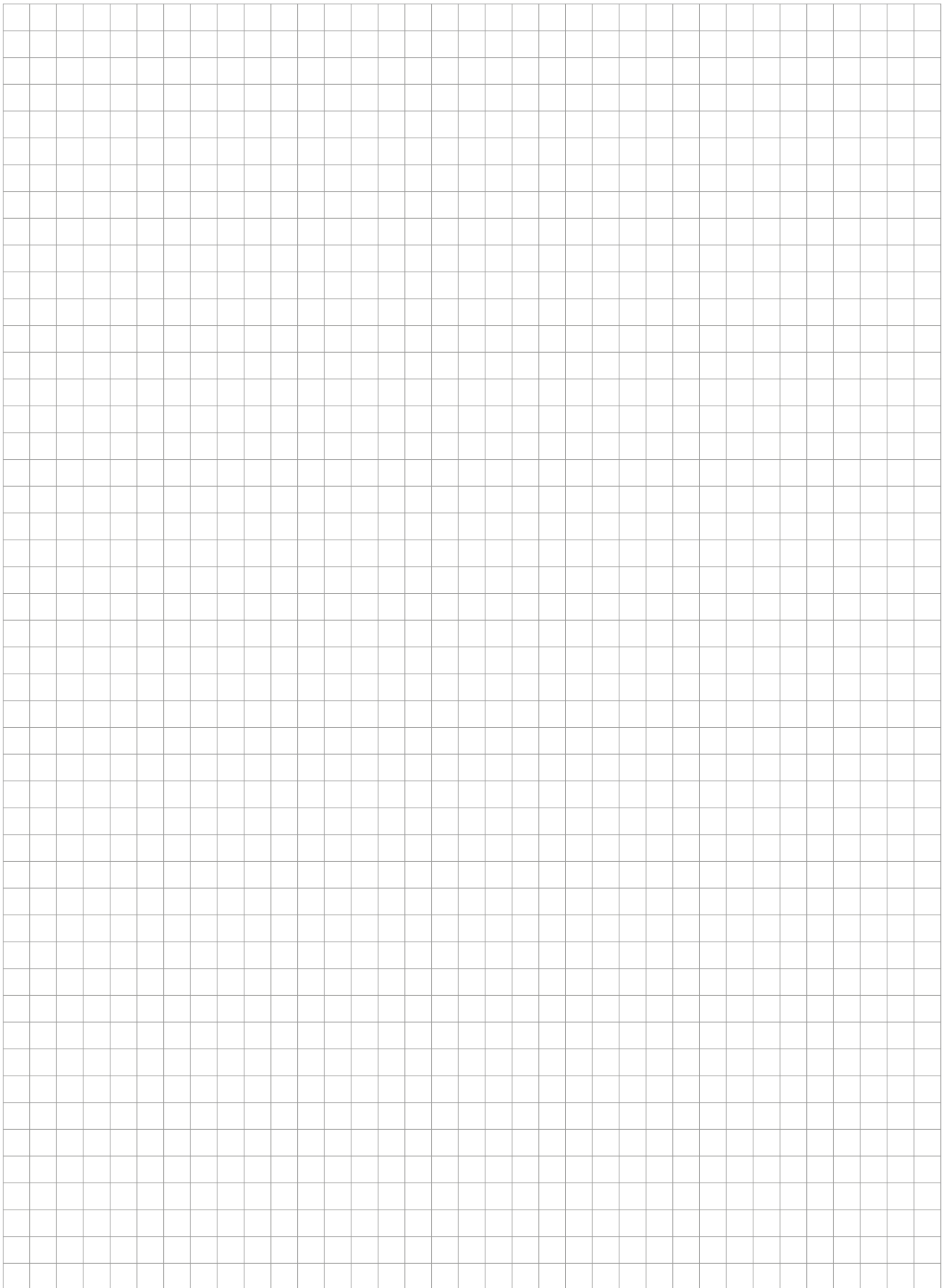


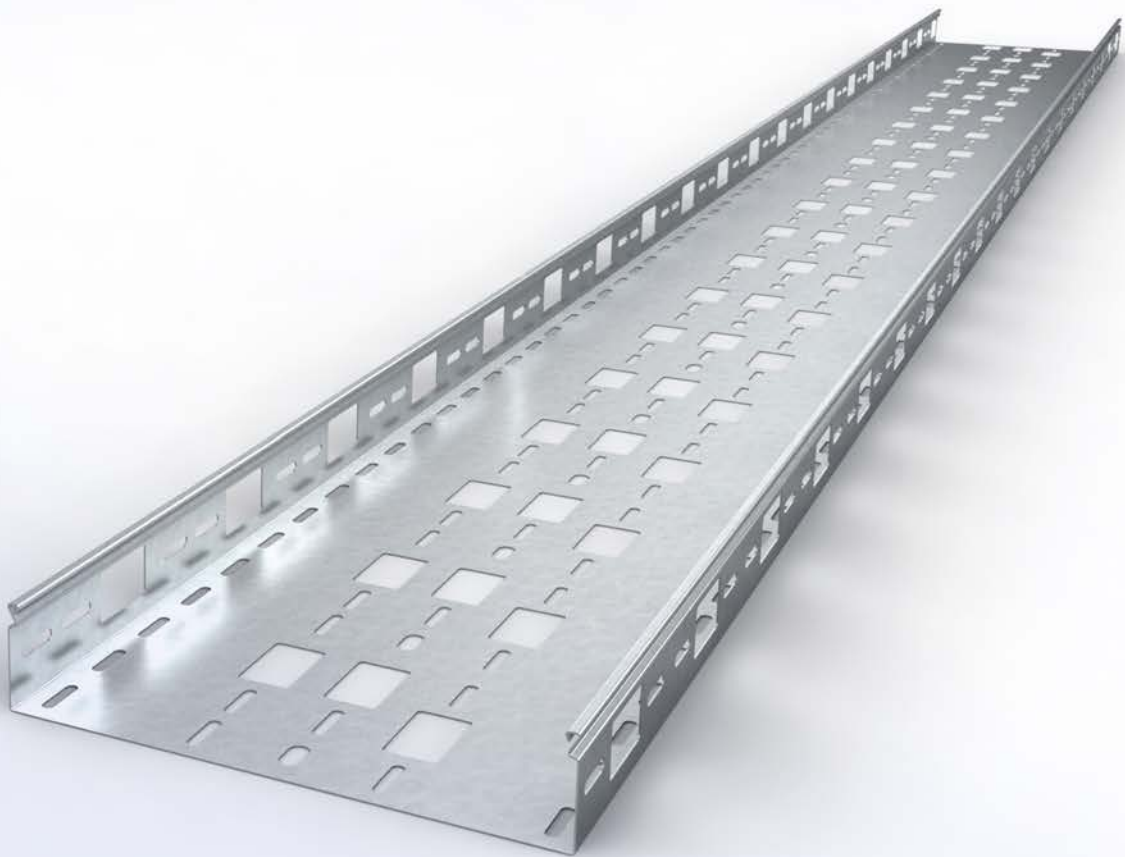
Support systems

In addition to the optional accessories (such as formed parts), support systems are also required for fastening the cable trays. We can offer you appropriate support elements for any cable management system to enable fastening to a wall or ceiling. These elements are available with various load-bearing characteristics.



Fastening screws are included with separating strips on delivery.





Cable installation trays

Product description

Our cable installation trays are a subcategory within our cable tray range. What sets them apart from the other cable trays is that they feature large side and bottom perforations, allowing cables to be fed out at virtually any point on the cable tray. Available in widths of up to 300 mm and featuring side walls with a height of 60 mm that can be fitted with various integrated elements (such as lights), the standard (RI) and heavy-duty (RIS) versions of our cable installation trays offer plenty of fastening options.

The low weight of our cable installation trays is truly impressive, particularly in view of their load-bearing capacity. The practical head shape of the side walls makes it really easy to attach positive-locking covers. With these in place, the cable installation tray protects cables against heat build-up and external influences. In addition, the RIS cable installation tray can be used to create a complete cable routing system that is very hard-wearing.

Just like all our other cable trays, our cable installation trays have been tested in accordance with DIN EN 61537.



Benefits

- Compatible with virtually all cable types and diameters
- High level of mounting flexibility thanks to the generous hole pattern
- Cables can be fed out at virtually any point on the cable tray
- Protection against heat build-up
- Easy ways of using the cable management systems to suit your individual requirements

Areas of application



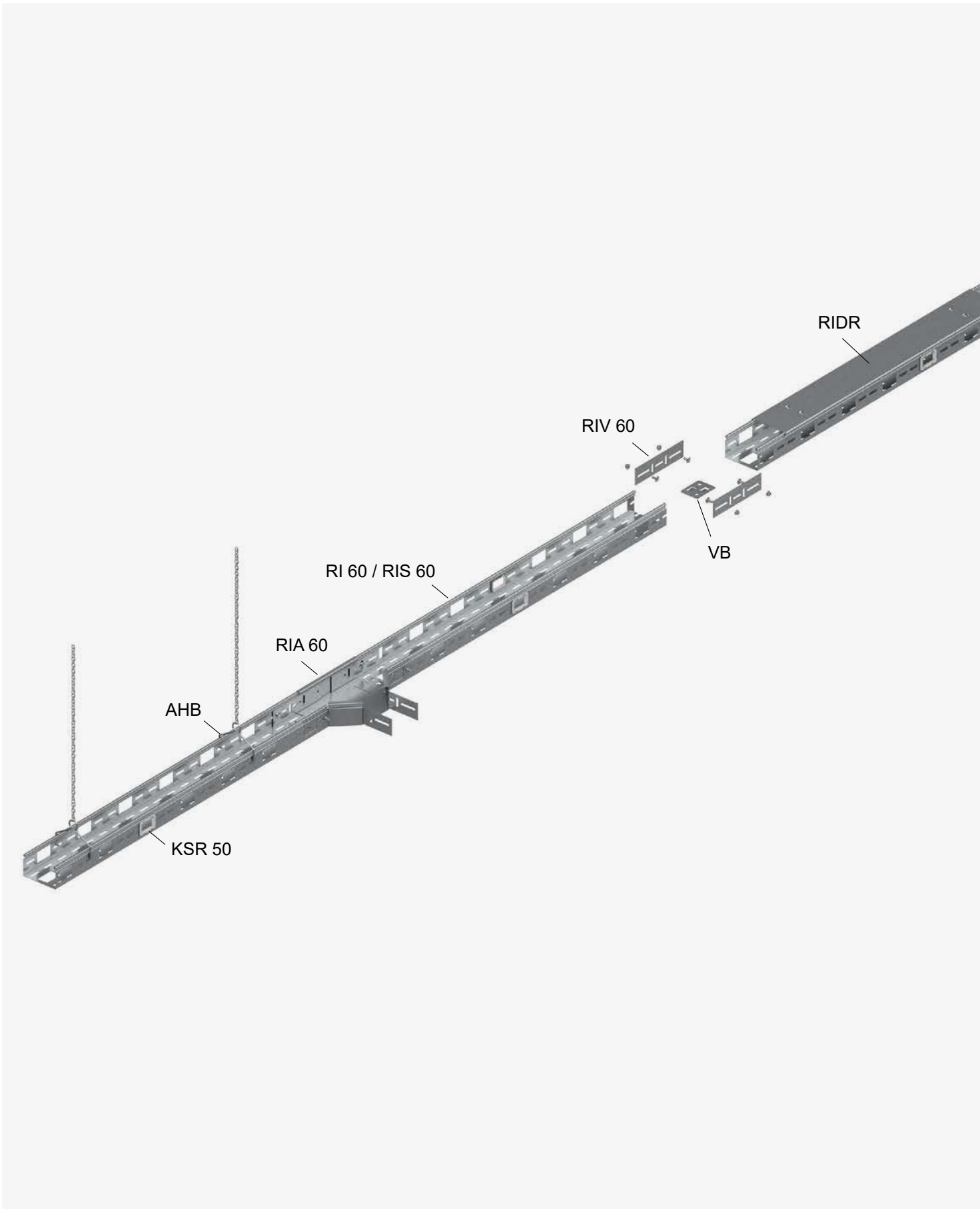
On walls and ceilings in the context of technical building equipment – indoors and outdoors



Hygienic areas, such as those encountered in the chemicals and food industries: stainless steel version (V2A)



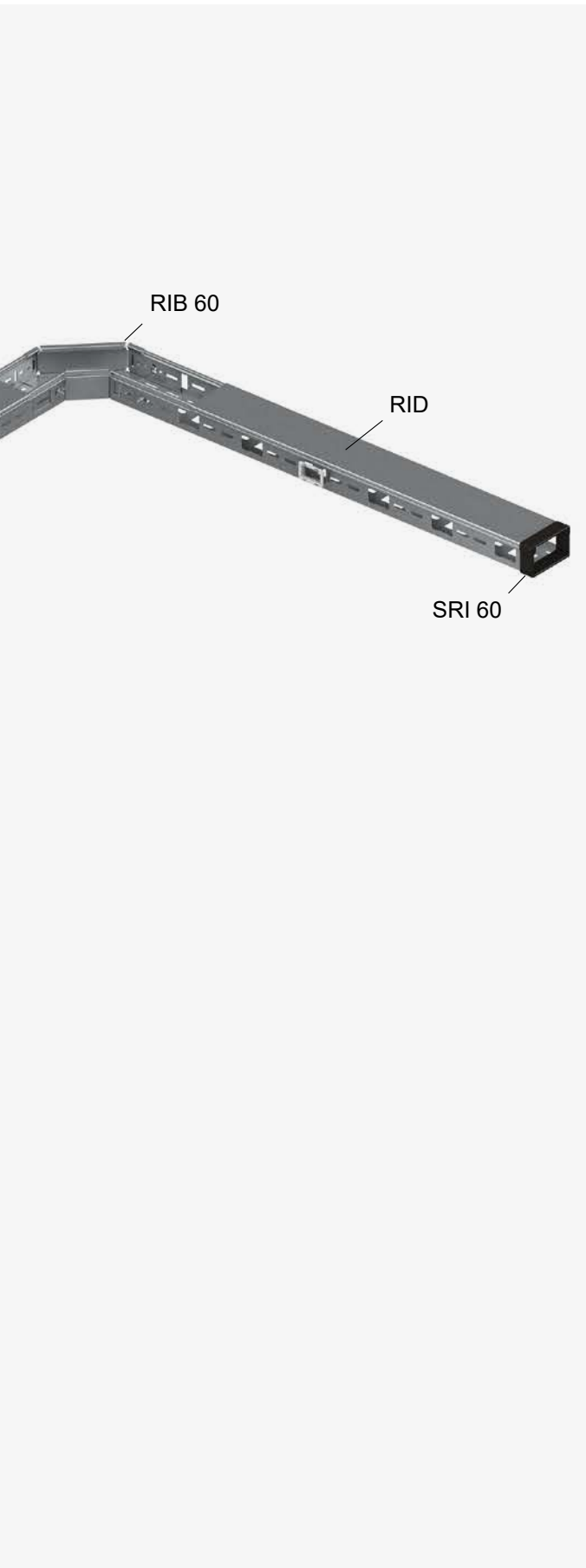
Tunnels: stainless steel version (V4A)



System overview

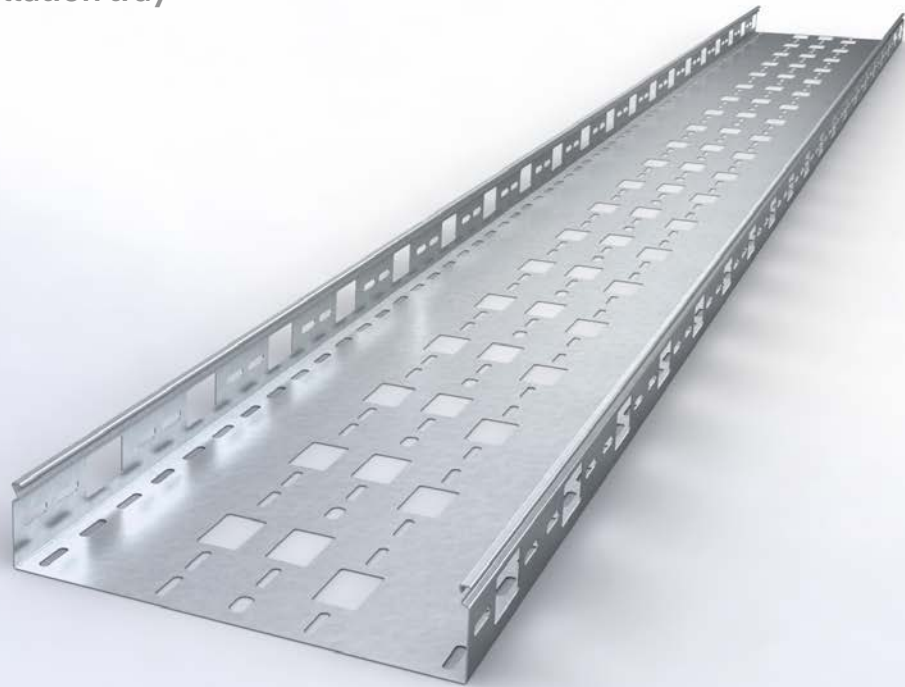
Cable installation trays can be flexibly combined with suitable formed parts and accessories, as well as the appropriate support systems. This results in a no-nonsense and easy-to-install system for routing cables from A to B. The RIB 60 cable installation tray bend and RIA 60 cable installation tray branch enable changes of direction to be configured with ease when routing cables through buildings. The system is rounded off by the RID positively locking cable installation tray cover without turning bolts or its counterpart the RIDR with turning bolts.

The entire system – including covers and formed parts – is also available in a heavy-duty design.



RI 60

Perforated cable installation tray



Product features

- Height of sides: 60 mm
- Available tray widths: 50 to 300 mm
- Length: 3,000 mm
- Cross-sectional areas of 28 to 238 cm²



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

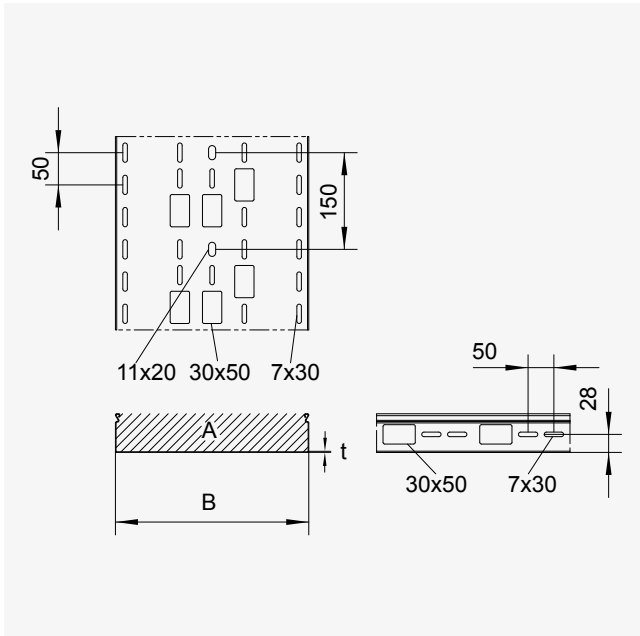


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg	G _E kg
RI 60-05	50	1.0	28	0.04	3.6	3.8	3.5
RI 60-10	100	1.0	58	0.09	4.6	4.9	4.5
RI 60-15	150	1.0	118	0.18	5.6	6.2	5.8
RI 60-20	200	1.0	178	0.27	6.2	6.8	6.2
RI 60-30	300	1.0	238	0.36	8.7	9.3	8.7

B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)

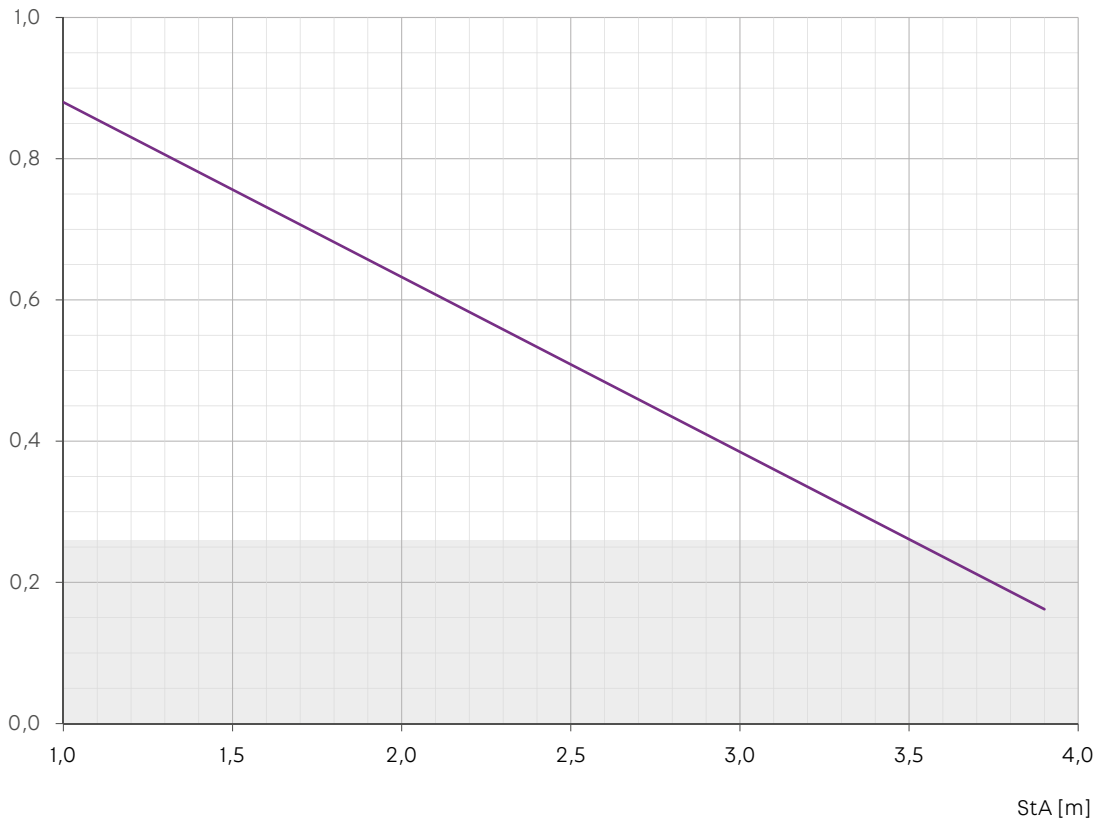


Example order
 Model/version: RI 60-05S

Load diagram

RI 60 **S F E**

Q_{max} [kN/m]



— Tray width: 100 to 300 mm

Q_{max} : Max. distributed load

■ Filled to capacity with maximum tray width

StA: Support distance



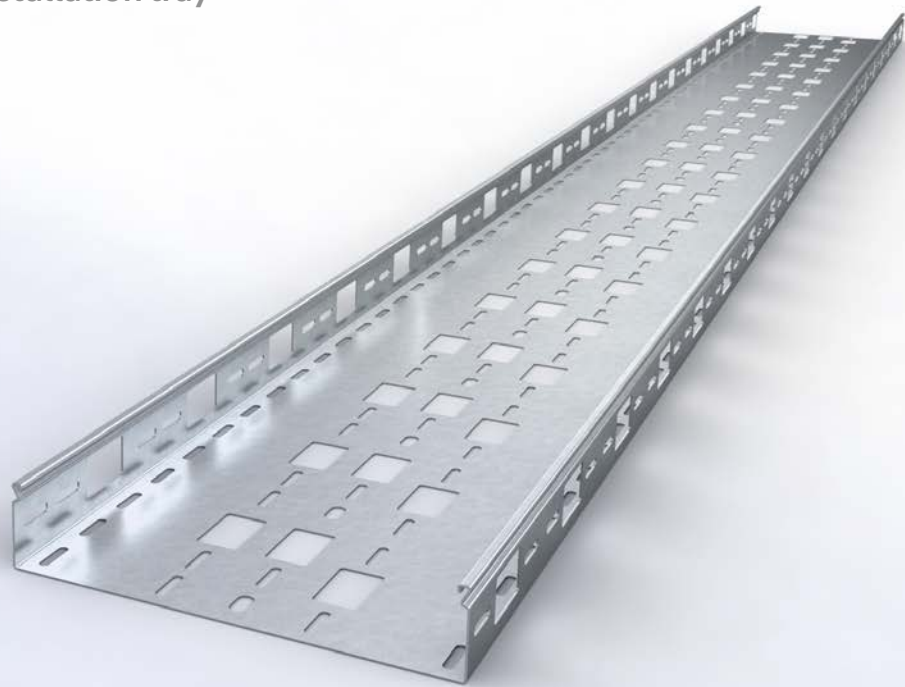
The filling capacity of cable installation trays may exceed their load-bearing capacity. You must build in sufficient reserves and, where applicable, plan using a multi-layered approach.



UL classified

RIS 60

Perforated, cable installation tray



Product features

- Height of sides: 60 mm
- Available tray widths: 50 to 300 mm
- Length: 3,000 mm
- Cross-sectional areas of 27 to 171 cm²
- Heavy-duty design for higher load levels



Special solutions

Further versions in other lengths and with variations on the existing hole patterns are available on request.

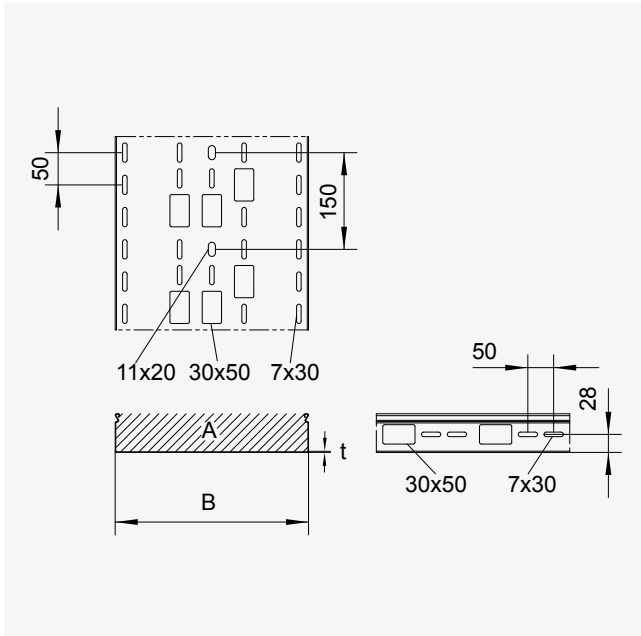


Keep off!

Available surface coatings and materials

- S** Sendzimir hot-dip galvanised in accordance with DIN EN 10346 (continuous strip galvanising)
- F** Hot-dip galvanised in accordance with DIN EN ISO 1461 (batch galvanising)
- E** Stainless steel, material no. 1.4301 (V2A) (on request)
- E4** Stainless steel, material no. 1.4571/1.4404 (V4A) (on request)
- XC** XC coating for reliable protection in highly corrosive environments (on request)
- Colour coatings (on request)

Technical data



Model	B mm	t mm	A cm ²	Q _{SK} kN/m	G _S kg	G _F kg
RIS 60-05	50	1.5	27	0.04	5.0	5.6
RIS 60-10	100	1.5	56	0.09	6.8	7.2
RIS 60-15	150	1.5	85	0.18	8.4	9.1
RIS 60-20	200	1.5	113	0.17	9.1	10.1
RIS 60-30	300	1.5	171	0.26	13.0	13.8

B: Width | t: Material thickness | A: Cross-sectional area | Q_{SK}: Control cable distributed load | G: Weight (per surface)



Example order
 Model/version: RIS 60-05S

Formed parts, covers and installation components



RIB 60
90° cable installation tray bend



RIA 60
Cable installation tray branch



RID
Cable installation tray cover



RIDR
Cable installation tray cover with turning bolts



RBD
90° cable tray bend cover



RBDR
90° cable tray bend cover with turning bolts



RIBDS
90° cable installation tray bend cover



RAD
Cable tray branch cover



RADR
Cable tray branch cover with turning bolts



RIADS
Cable installation tray branch cover



RIV 60
Cable installation tray connector



VB
Connection plate connector



REB
Cable tray end-plate



KSR
Cable protection ring



SRI 60
Protection end cap



SRI-EO
Top extension for protection cap SRI 60



SRI-EU
Lower extension for protection cap SRI 60



AHB
Suspension bow



RITR 60
Cable tray separating strip



MP-RG
Assembly plate



Support systems

In addition to the optional accessories (such as formed parts), support systems are also required for fastening the cable installation trays. We can offer you appropriate support elements for any cable management system to enable fastening to a wall or ceiling. These elements are available with various load-bearing characteristics.

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.

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

Cable selection

To be selected on the basis of:

1. The quantity or volume of cables that a cable tray is intended to hold (**capacity or size of cable tray**)
2. The weight of the cables that a cable tray is intended to hold (**type of cable tray**)
3. The distance between the cable tray support points (**load-bearing capacity of cable tray**)

Capacity/useful cross section

If the cable volume (types, sizes and number of cables) is unknown, you can estimate it using Table 2 "Space requirements and weight of NYY-type cables".

For each size of cable, the amount of space required must be multiplied by the number of cables of that size. These values must then be added together to give the grand total. This results in the minimum cross-sectional area (A) of the cable tray you are looking for. Where necessary, we recommend working with a reserve factor. Regardless of this, the stipulations of VDE 0100 on the occupancy of cable trays must always be observed.

The usable cross-sectional area (A) of each cable tray is specified in the product tables. Depending on the application, several cable trays may be laid parallel to one another.

Cable weight

The exact details provided by the cable manufacturer can usually be used for this purpose. Relevant lists or tables can generally be requested directly from the manufacturer so that the cable weights can be calculated as accurately as possible.

If the total weight of the cables is unknown, you can estimate it using Table 2 "Space requirements and weight of NYY-type cables".

For each cable size, the cable weight must be multiplied by the number of cables. These values must then be added together to give the grand total. This results in the estimated cable load (Q).

Load-bearing capacity/support distance

All stated load-bearing capacities relate to the product concerned.

The load-bearing capacity of the installed system depends on how the system is filled/loaded and, in particular, how the load is applied to the supporting structure.

However, from a safety perspective, the maximum possible cable load is crucial. DIN VDE 0639-1 is a good source of reference if you require further design and calculation criteria. The result of the distributed load for the respective cable type (control cable Q_{SK} or power cable Q_{LK}) is specified for each cable tray in the tables.

Support distance

The recommended standard support spacing is 1.5 m. However, a greater spacing may actually be possible depending on the specified fastening options (pillars, purlins, etc.). The load diagrams must be used to determine the maximum load (Q_{max}) that the cable tray can support with the given support spacing.

Table 2: Space requirements and weight of NYY-type cables

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.

Example 1

Determining the maximum permissible additional load Q_{Zus} or load reserve based on the example of the RG 60-40S with a support distance StA of 1.5 m

The load diagram data and Table 3 data are known from the product documentation:

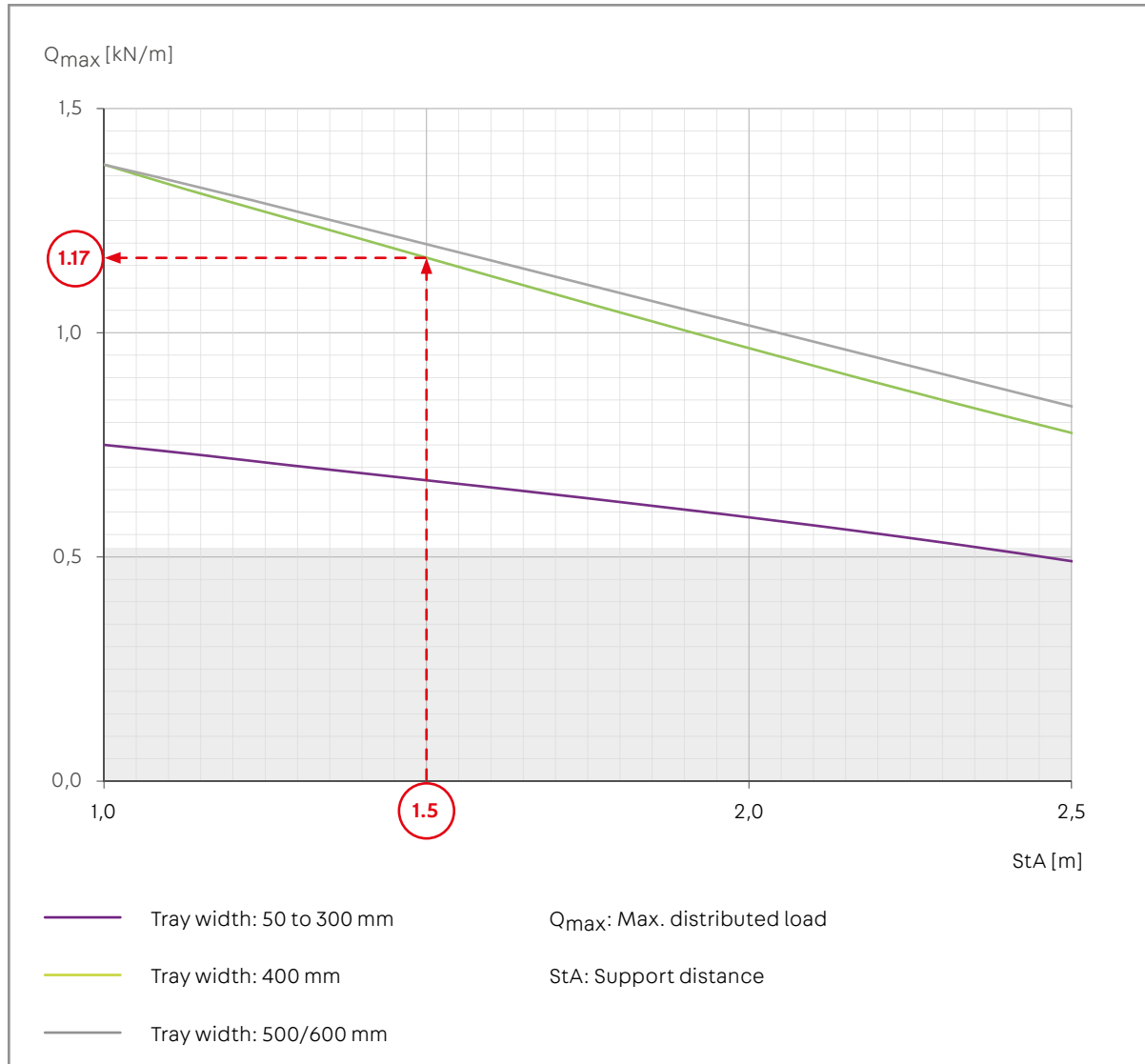


Figure 1: RG 60 load diagram with the support distance of 1.5 m marked

Item number	B mm	A cm ²	Q_{SK} kN/m
R 60-40S	400	237	0.36

Table 3: Data for the R 60-40S from the R/RG 60 product table

For a support distance $StA = 1.5$ m, the load diagram reveals that:

$Q_{max} = 1.17 \text{ kN/m}$

The maximum permissible additional load being sought is the difference between the maximum load and the potential cable load:

$Q_{max} - Q_{SK} = Q_{Zus}$

$1.17 \text{ kN/m} - 0.36 \text{ kN/m} = 0.81 \text{ kN/m}$



Thus, with $StA = 1.5$ m, the maximum permissible additional load is 0.81 kN/m.

Example 2

Determining the maximum support distance StA based on the example of the RG 60-10F with an additional load of 0.4 kN/m.

The load diagram data and Table 4 data are known from the product documentation:

Item number	B mm	A cm ²	Q _{SK} kN/m
R 60-10F	100	57	0.09

Table 4: Data for the R 60-10F from the R/RG 60 product table

According to Table 4, the distributed load of the control cable is:

$$Q_{SK} = 0.09 \text{ kN/m}$$

The maximum load is calculated using the rear-ranged equation from example 1:

$$Q_{max} = Q_{Zus} + Q_{SK}$$

$$0.49 \text{ kN/m} = 0.4 \text{ kN/m} + 0.09 \text{ kN/m}$$



Thus, with a maximum permissible additional load of 0.4 kN/m, the maximum load Q_{max} is 0.49 kN/m.

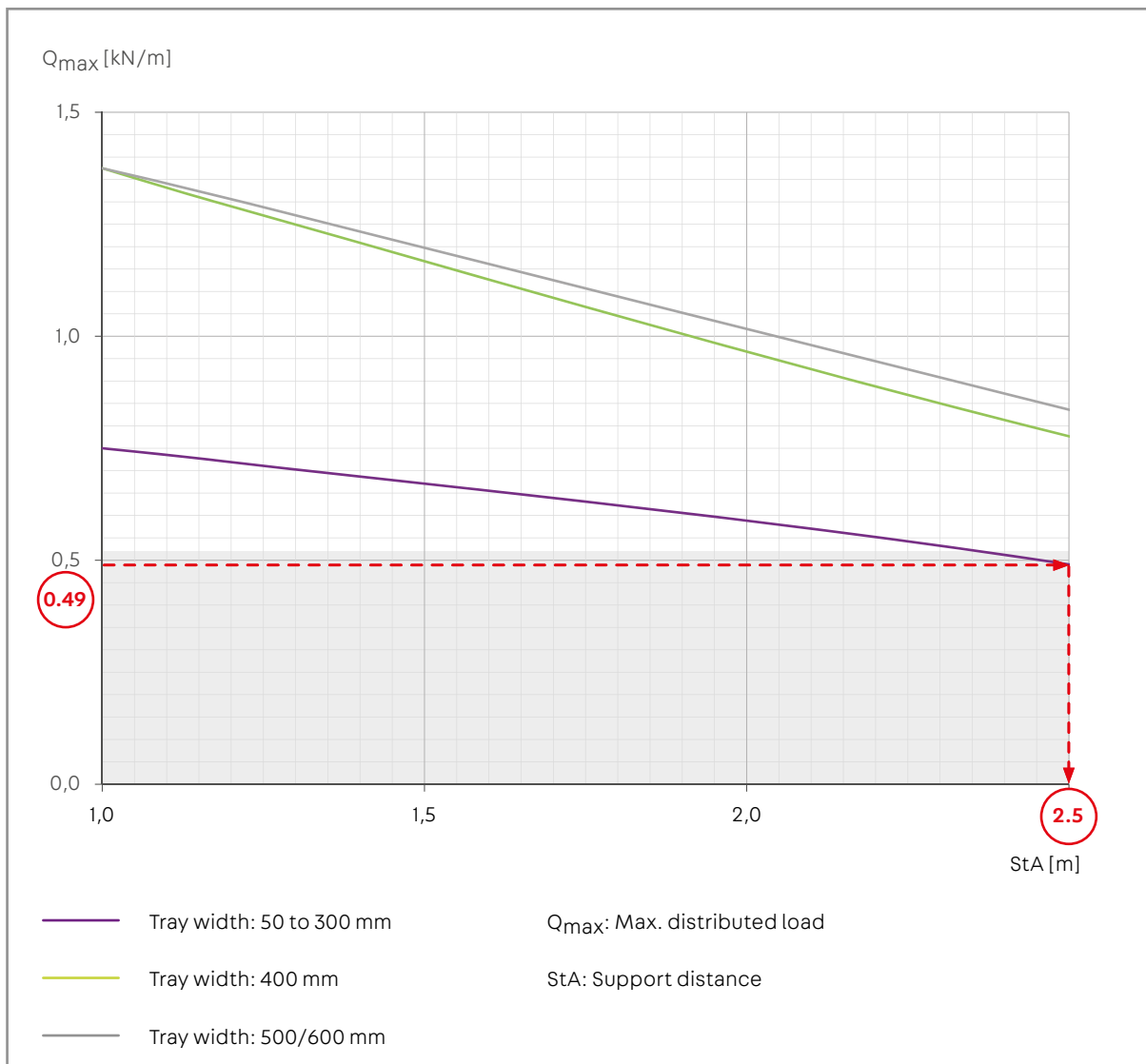


Figure 2: RG 60 load diagram with the maximum load Q_{max} marked for the purpose of determining the maximum support distance StA

The maximum support distance being sought can now be determined from the load diagram with the aid of Q_{\max} .

Thus, the maximum support distance is $StA = 2.5$ m.



The load diagrams include a safety reserve of at least 70% before the possible point of failure is reached (in accordance with DIN EN 61537). Nevertheless, nobody is allowed to stand on cable trays! If the maximum load (Q_{\max}) or the maximum support distance (StA) of the respective cable tray are not sufficient, check whether you can use versions with a higher load-bearing capacity instead.

Alternative cable tray types

A higher load with the same support distance

As an alternative, other cable management systems can be used for a defined support spacing. This technique enables the use of alternative systems that are capable of transmitting higher loads because of their rigidity.

The load-bearing capacities must be observed for the cable management systems selected, along with the permissible support spacings!

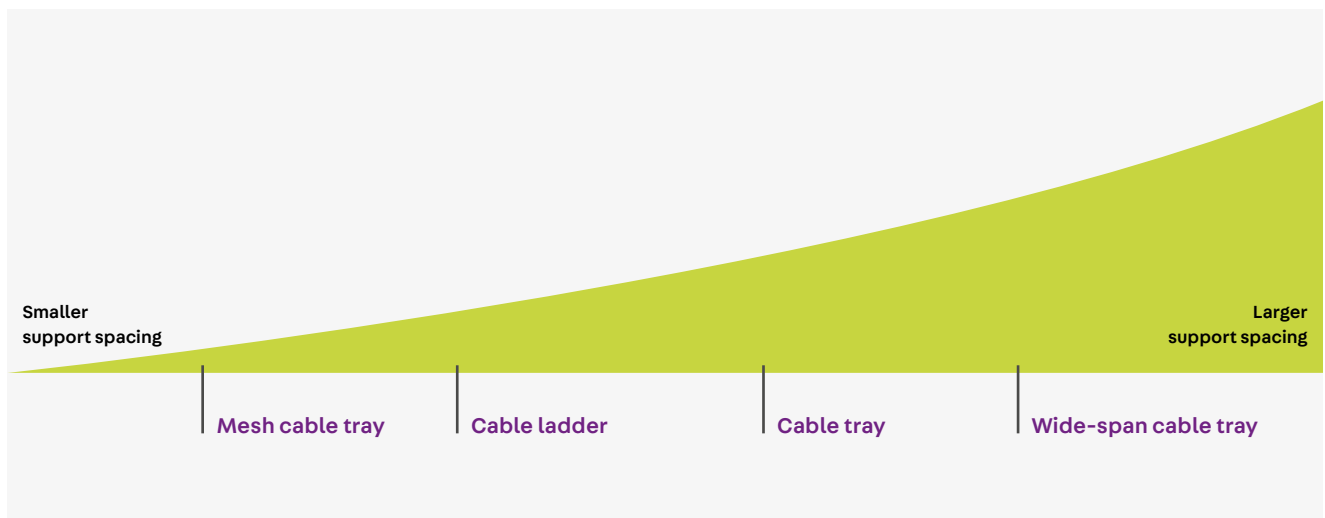


Figure 3: Alternative cable management systems according to permissible support spacings

Selecting the right support system

When routing cable trays on ceilings, the support systems usually consist of a stem supports and ceiling supports. When attaching cable trays to walls, wall brackets, profile rails and stem supports are used. To enable the selection of systems with sufficient load-bearing capacity, the first step is to calculate the load of each cable tray at the support point.



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



The load diagrams already have a safety concept built in. This is because the load-bearing capacities - which have been determined in accordance with test standard DIN 61537 - have appropriate safety factors applied to them. If the load levels or support distances are not sufficient for proper dimensioning of the cable management systems, the next version up (i.e. one with higher load levels) must be selected or the support distances must be reduced.

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.



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Testing according to DIN EN 61537

Cable management systems

Among other things, DIN EN 61537 determines which test procedure is to be followed when testing the mechanical properties of the cable support elements.

The following undergo testing:

1. Cable trays including connectors with an appropriate design

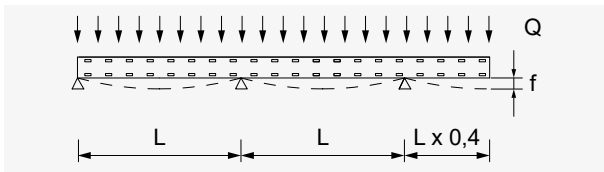


Figure 4: Load diagram for the testing of a cable tray
Q: Distributed load | L: Support distance

2. Brackets as an individual component, i.e. without the reinforcing effect provided by assembled cable trays. The stated load-bearing capacities are based on the loads measured with a level of deformation that is still permissible (f_{zUl}) for the cable support elements in the respective standard version (e.g. Sendzimir/hot-dip galvanised).

Safety

A safety factor of 1.7 must be incorporated into the tested structures, as per the safety concept required under the test standard. The failure scenario possible as a result is not tantamount to the respective structure breaking. Rather, it involves the structure becoming so heavily deformed that no further increase in load can be registered. For this reason, the elastic-plastic deformability of metal cable support systems makes them preferable to brittle plastic systems that break easily.

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

Cable trays

The cable trays undergo testing on a specially developed test stand. This ensures even surface loading of the components that bend elastically under load.

$$f_{zUl} \text{ (in longitudinal direction)} = 0.01 \times \text{support distance StA}$$

$$f_{zUl} \text{ (in transverse direction)} = 0.05 \times \text{cable tray width B}$$

Arms/brackets

Under a vertical load, the tips of the arms are allowed to drop by:

$$f_{zUl} = 0.05 \times \text{arm length (but } \leq 30 \text{ mm)}$$

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.

Our synergy concept for your benefit

With us, you can take advantage of the collective experience of three established manufacturers that combine products and expertise in one comprehensive offer. That is the PohlCon synergy concept.



Full service consulting

Our extensive network of consultants is available to answer all of your questions about our products on site. From planning to deployments, enjoy personal support from our qualified professionals.



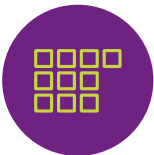
Digital solutions

Our digital offerings offer targeted support in planning with our products. From tender texts through CAD details and BIM data to modern software solutions, we offer you tailored support for your planning.



7 areas of application

We think in holistic solutions, which is why we have grouped our products into seven areas of application for you where you can benefit from the synergy of the PohlCon product portfolio.



10 product categories

To help you find the right product in our extensive range even faster, the products are grouped into ten product categories so you can navigate clearly between our products.



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There's no mass produced-product on the market that is suitable for your project? We master extraordinary challenges with the many years of expertise of our three manufacturing brands in the sector of individual solutions, allowing us to realize your unique construction projects together.



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