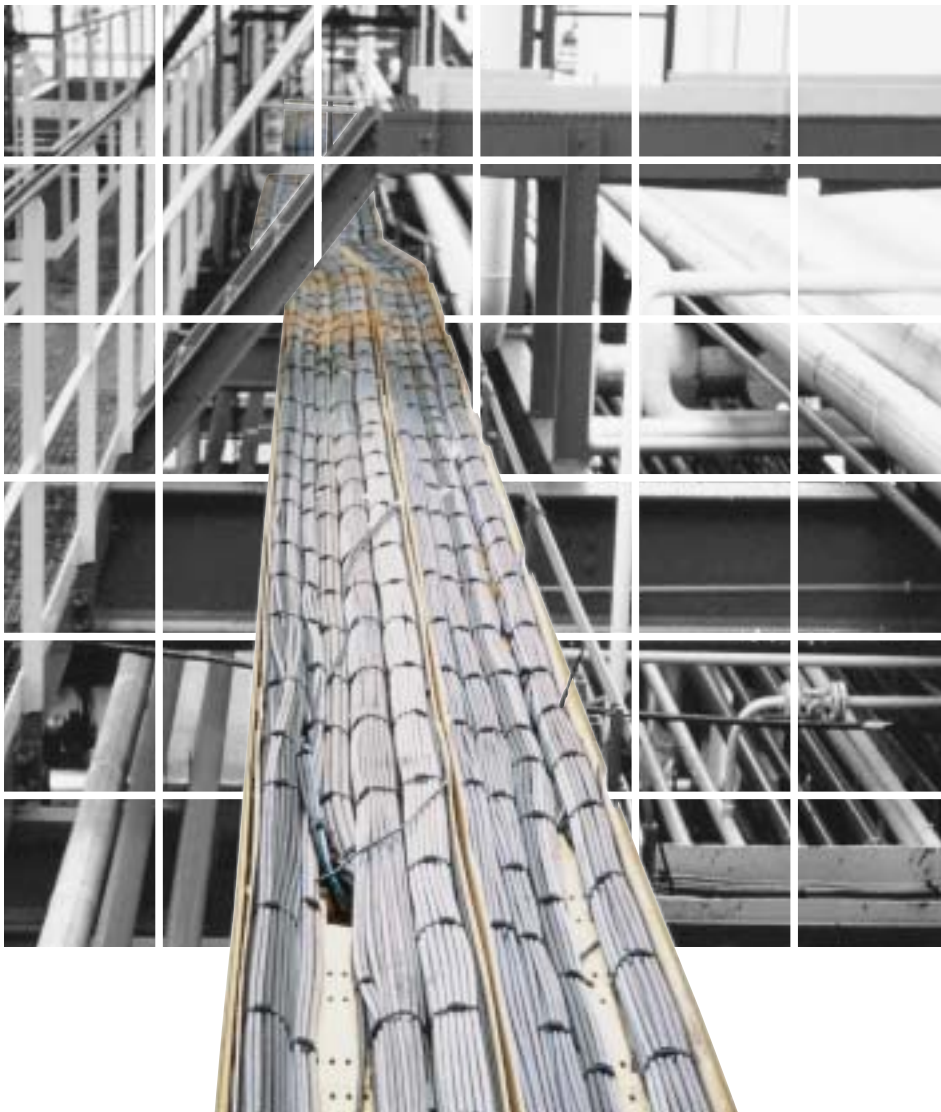


## Cable trays in FRP/GRP *KP series - pultruded*



**Challenging time**



## Composites FRP/GRP

A material whose features  
challenge time.

### Five reasons to choose composites :

- 1 Resistance to corrosion
- 2 insulating
- 3 extremely robust and light
- 4 long life span
- 5 excellent fire characteristics



*Pressed cable trays  
K<sup>2</sup> series*

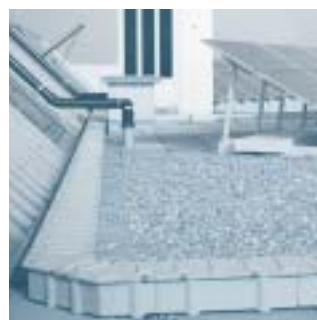


*Pultruded cable trays*

*Supporting material  
FX and FP series*



*Cable Ladders  
UL series*



*Cable ducting system  
BK series*

Ebo Systems :  
40 years of experience  
in the manufacture of  
composite materials.

**Halve** your installation time :

- the possibility of 4 m support distances,
- clip in connector pieces, without bolts,
- clip on lids.

**Increase** the life span of your installation\* using Glass Reinforced Polyester (GRP) technology.



Summary	
Cable trays in FRP/GRP <i>KP series</i> : challenging time	3
Advantages of cable trays in GRP <i>KP series</i>	4
<i>KP series</i> - Product guide	6
<i>KP series</i> - Product selection	8
Technical features of the <i>KP series</i>	10
Method of installation	13
Product application : The Channel Tunnel	14
Dedicated services	15

### Reference guide

**KP** | **B A** | **3 0 0** | **8 0** / **6** - **450** - **VY** - **RAL 9001**



- options :
- length (m)
  - radius (mm)
  - resin : acrylic (AC), vinylester (VY), special (SP)
  - RAL color

(\* ) This gain in life span is variable according to applications ; the gain is much more marked when comparing a GRP installation to galvanised steel in a very corrosive environment (eg : coastal sites, road tunnels...)

## Maintenance free



- No corrosion
- Examples available of products in situ in aggressive environment for more than 40 years
- No electrolytic corrosion
- No need for painting and protective varnishes

## Fast installation



## Insulating



- Extremely insulating material (>7kV/m)
- No need to earth
- Excellent cable protection



- Quick assembly with clip in jointing pieces
- Expansion joint automatically set
- Easy to cut and drill



- Easy to cut up and
- Security : no sharp edges, no risk to people





- Cable trays can accommodate up to 4 m support distance

## Maximum fire security



- Self-extinguishing, without toxic fumes,
- Answers to the most demanding international fire norms
- Zero halogen
- Low thermal conductivity
- Allows cables to keep their electric function longer

## Lightness



- Fast fix clip on lids
- Easy maintenance



- Light and robust
- Optimal transportation and handling

...d to adapt on site  
...o edges and therefore  
...or cables

### GRP cable trays and fittings

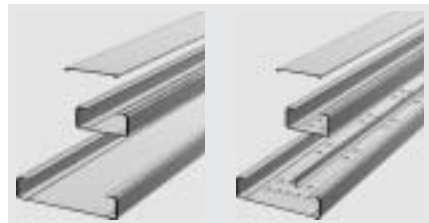
Height (mm)	Width (mm)
-------------	------------

50	100	Cable tray
		Cover
	150	Cable tray
		Cover
	200	Cable tray
		Cover

80	100	Cable tray
		Cover
	200	Cable tray
		Cover
	300	Cable tray
		Cover

Colisage

\* stocked also in 6 m  
références : KP\_ \_ \_ \_ \_ /6



Cable trays

KP  
(Length = 3 m\*)

KPL

Non perforated	Perforated	Separation
----------------	------------	------------

KP 10050	KPL 10050	standard KP T50
KP D100		
KP 15050	KPL 15050	ready mounted KP T50/M
KP D150		
KP 20050	KPL 20050	
KP D200		

KP 10080	KPL 10080	standard KP T80
KP D100		
KP 20080	KPL 20080	ready mounted KP T80/M
KP D200		
KP 30080	KPL 30080	
KP D300		

3 metres



Pultruded

Horizontal  
elbow 90°



Pressed

Horizontal  
elbow 90°

KP B10050	KP B10050/P
KP BD100	KK BD100
KP B15050	KP B15050/P
KP BD150	KK BD150
KP B20050	KP B20050/P
KP BD200	KK BD200

KP B10080	KP B10080/P
KP BD100	KK BD100
KP B20080	KP B20080/P
KP BD200	KK BD200
KP B30080	KP B30080/P
KP BD300	KK BD300

piece

### Accessories

Height (mm)	Width (mm)
-------------	------------

50	100
	150
	200

80	100
	200
	300

Unit



Rack for cables in vertical zone

KR100
KR150
KR200

KR100
KR200
KR300

piece










Couplers

KP GH50

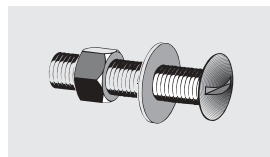
KP GH80

1 set of 2 couplers

						
Pultruded	Pressed	Pultruded	Pressed	Pressed	Pressed	Pressed
Vertical exterior elbow 90°	Vertical exterior elbow 90°	Vertical interior elbow 90°	Vertical interior elbow 90°	T-junction (small radius)	T-junction (large radius)	Endcap
KP BA10050	KP BA10050/P	KP BI10050	KP BI10050/P	KP SS10050/P		KP KE10050
KP BAD100	KK BAD10050	KP BID100	KK BID10050	KK SSD100		
KP BA15050	KP BA15050/P	KP BI15050	KP BI15050/P	KP SS15050/P		KP KE15050
KP BAD150	KK BAD15050	KP BID150	KK BID15050	KK SSD150		
KP BA20050	KP BA20050/P	KP BI20050	KP BI20050/P	KP SS20050/P		KP KE20050
KP BAD200	KK BAD20050	KP BID200	KK BID20050	KK SSD200		
KP BA10080	KP BA10080/P	KP BI10080	KP BI10080/P		KP ST10080/P	KP KE10080
KP BAD100	KK BAD10080	KP BID100	KK BID10080		KK STD100	
KP BA20080	KP BA20080/P	KP BI20080	KP BI20080/P		KP ST20080/P	KP KE20080
KP BAD200	KK BAD20080	KP BID200	KK BID20080		KK STD200	
KP BA30080	KP BA30080/P	KP BI30080	KP BI30080/P		KP ST30080/P	KP KE30080
KP BAD300	KK BAD30080	KP BID300	KK BID30080		KK STD300	
piece	piece	piece	piece	piece	piece	piece

## Bolts

Diameter (mm)	Length (mm)
6	16
	20
8	20
10	30
<b>Unit</b>	



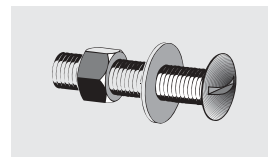
Dome head screw, nut and washer V4A stainless steel

M616/V4A

M620/V4A

M1030/V4A

100 pieces



Dome head screw, nut and washer reinforced polyamide

M820/PA6

100 pieces

## Optimize your installation :

The exceptional resistance of our pultruded composite materials for the service of your electric installation

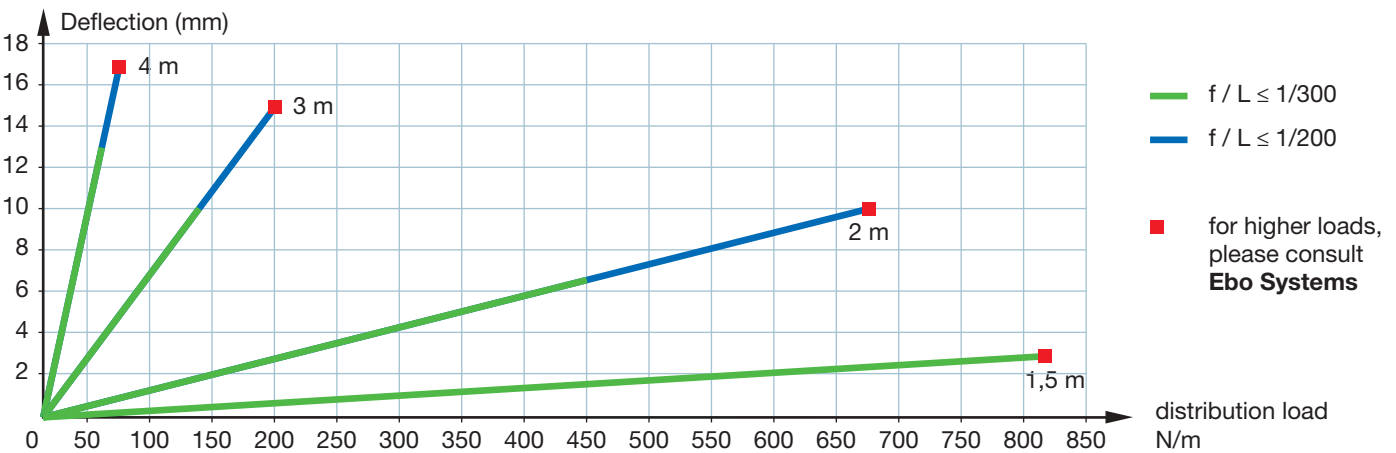
	Useful area (mm <sup>2</sup> )	Weight of cables** (daN/m)	Maximum admissible load (daN/m) according to the distance between supports*					
			1,5 m	2 m	2,5 m	3 m	3,5 m	4 m
<b>KP...50</b>	100	3700 ≈ 10	70	40	20	15	10	<p>Ebo Systems recommends to use the <b>K<sup>2</sup> series</b></p> <p>Ebo Systems especially conceived the <b>UL53 series</b></p>
	150	5700 ≈ 15	70	40	20	15	10	
	200	7700 ≈ 20	70	40	20	15	10	
	300 à 600							
<b>KP...80</b>	100	6600 ≈ 15	160	120	70	40	30	<p>Ebo Systems recommends to use the <b>K<sup>2</sup> series</b></p> <p>Ebo Systems especially conceived the <b>UL80 series</b></p>
	200	13500 ≈ 35	160	120	70	40	30	
	300	19600 ≈ 55	160	160	140	70	40	
	400 à 900							

**KP series** optimal conditions, for cost reduction on your installation

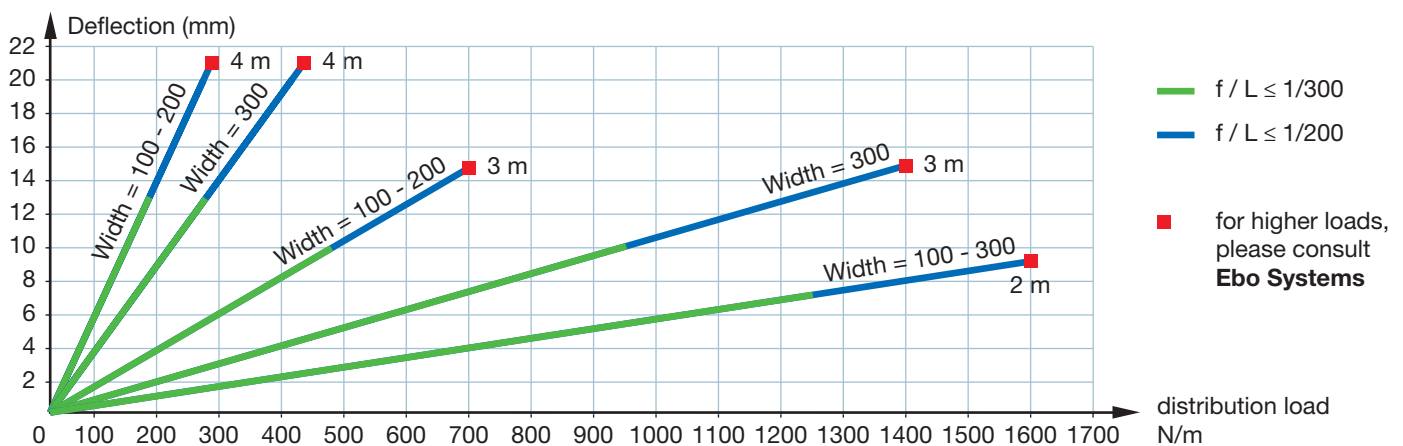
\* For supporting distances greater than 4 m, please consult us.

\*\* weight of cables corresponding to a maximum fill, estimated according to the NF C 68-102 norm.

### KP 50 series load diagram : supporting distances from 1,5 to 4 m.



### KP 80 series load diagram : supporting distances from 2 to 4 m.

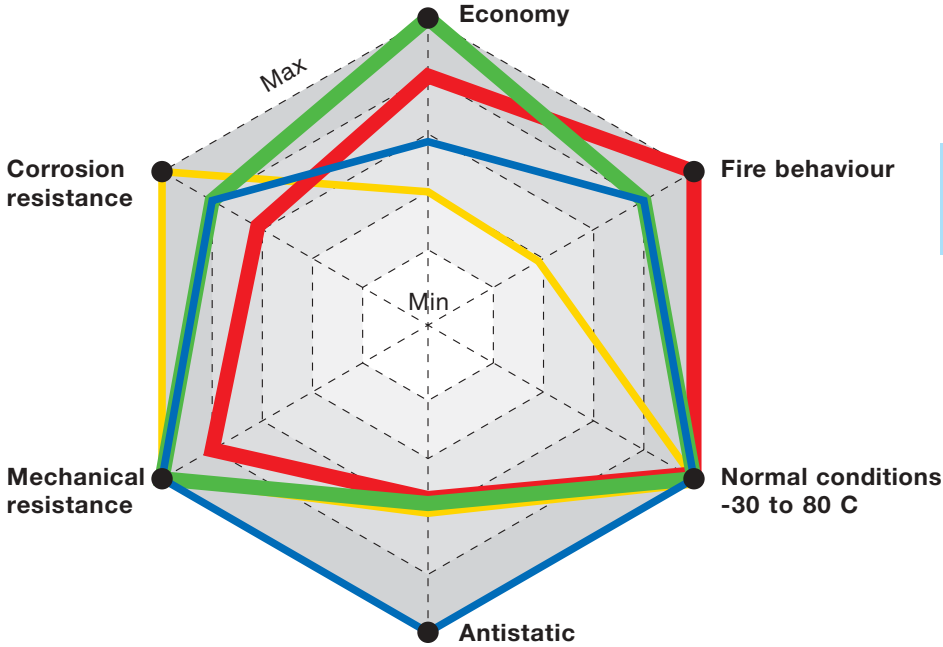


All our cable trays are tested in accordance with the project of international norm CEI 61537, at an ambient temperature of 25° C, and in accordance with our installation instructions.



## Select your resins :

Dedicated solutions for aggressive environments



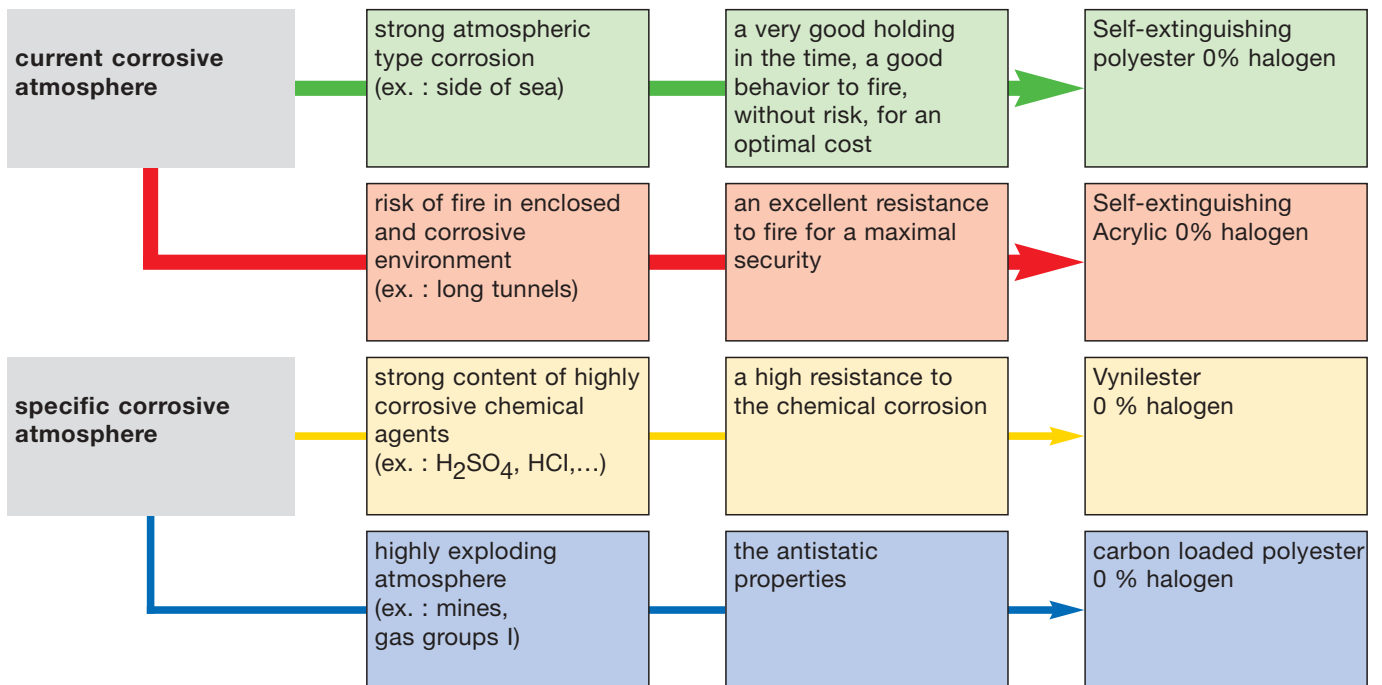
The nearer the curve to the outside of the hexagone, the better the solution.

You are in presence of :

Your environment :

Your requirements :

Our recommendation :



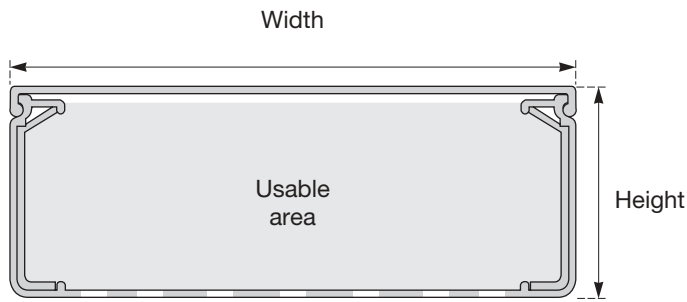
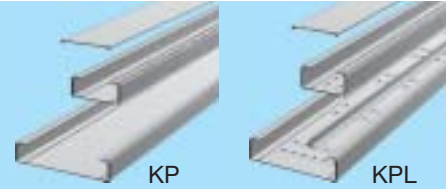
For specific projects we will define solutions to meet your needs.

The composite cable trays **KP series** are available :

**as standard** : - with polyester resin, Zero halogen,  
- in RAL 7032 (light grey),

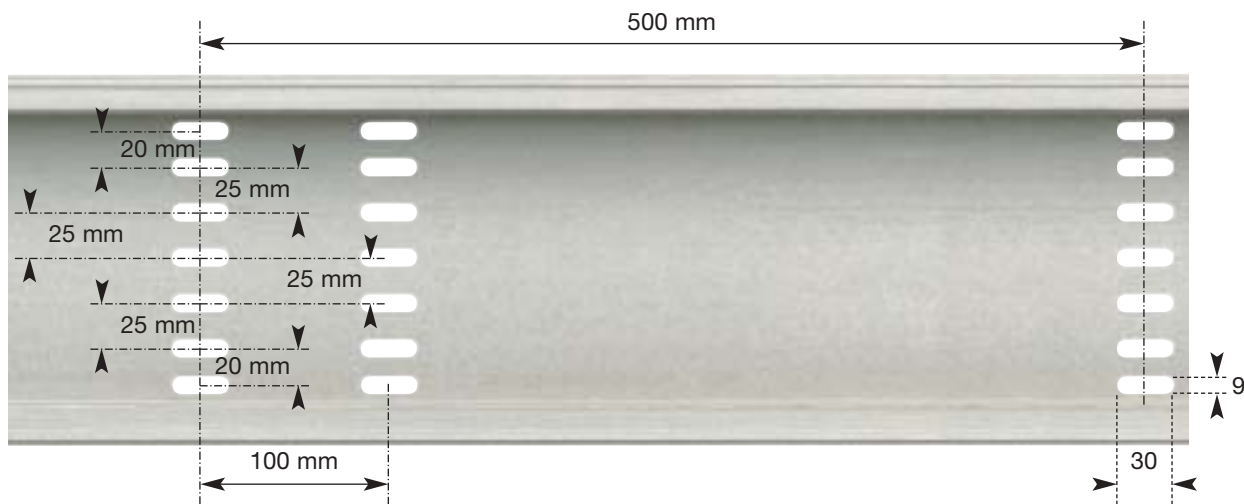
**one request** : - please consult our technical resin cards



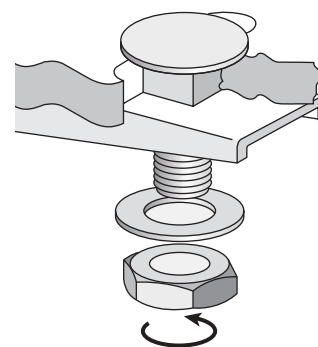
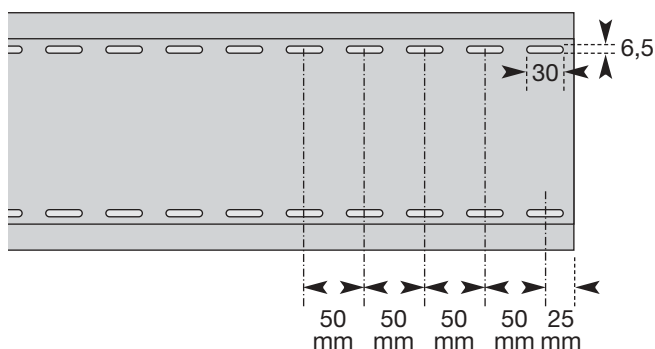


Height (mm)	Width (mm)	Length (mm) *	Reference tray	Weight (kg/m)		Usable area (mm <sup>2</sup> )
				Tray	Tray + Cover	
50	100	3000	KP(L) 10050	1,0	1,5	3700
	150	3000	KP(L) 15050	1,2	2,0	5700
	200	3000	KP(L) 20050	1,4	2,4	7700
80	100	3000	KP(L) 10080	1,3	1,8	6600
	200	3000	KP(L) 20080	2,3	3,3	13500
	300	3000	KP(L) 30080	3,6	5,0	19600

\* stocked also in 6 m references : KP\_.../6



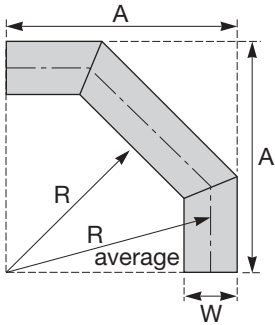
For special perforations, please consult us.  
Example : special perforations 6,5 x 30 mm adapted to support fixation with a self-locking bolt M6 x 20 TRCC / V4A



M6 x 20 TRCC / V4A

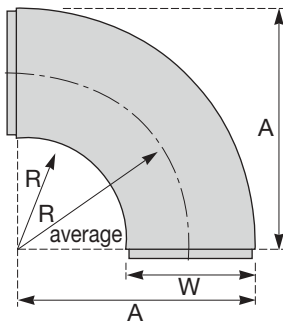


### Pultruded horizontal elbow 90°



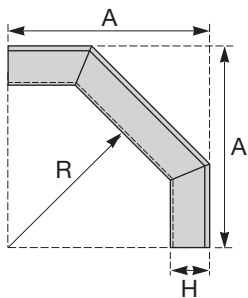
Height H (mm)	Width W (mm)	Reference tray	Weight (kg/m)		Curvature Radius R (mm)	Dimension A (mm)
			Tray	Tray + Cover		
50	100	KP B10050	0,8	1,4	350	450
	150	KP B15050	1,0	1,7	350	500
	200	KP B20050	1,3	2,2	350	550
80	100	KP B10080	1,0	1,6	350	450
	200	KP B20080	1,8	2,7	350	550
	300	KP B30080	2,9	4,6	350	650

### Pressed horizontal elbow 90°



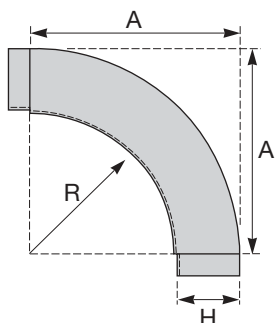
50	100	KP B10050/P	0,3	0,5	100	225
	150	KP B15050/P	0,6	1,0	175	350
	200	KP B20050/P	0,8	1,5	200	425
80	100	KP B10080/P	0,4	0,6	100	225
	200	KP B20080/P	0,9	1,6	200	425
	300	KP B30080/P	1,5	2,5	225	550

### Pultruded exterior elbow 90°



50	100	KP BA10050	0,4	0,8	330	380
	150	KP BA15050	0,5	1,2	330	380
	200	KP BA20050	0,7	1,6	330	380
80	100	KP BA10080	1,0	1,4	330	410
	200	KP BA20080	1,5	2,4	330	410
	300	KP BA30080	2,2	3,5	330	410

### Pressed exterior elbow 90°

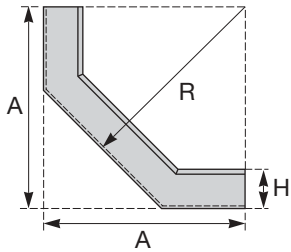


50	100	KP BA10050/P	0,3	0,6	170	245
	150	KP BA15050/P	0,4	0,8	170	245
	200	KP BA20050/P	0,5	1,0	170	245
80	100	KP BA10080/P	0,4	0,7	170	275
	200	KP BA20080/P	0,6	1,1	170	275
	300	KP BA30080/P	0,8	1,5	170	275

$$R \text{ average} = R + \frac{W}{2}$$

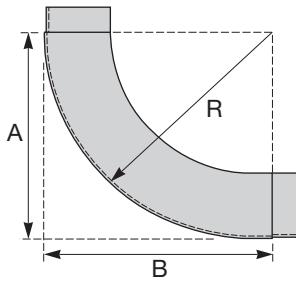


### Pultruded vertical elbow 90°



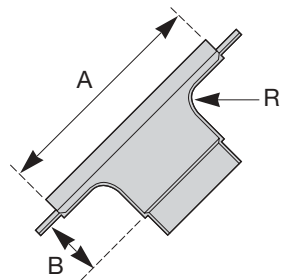
Height H (mm)	Width W (mm)	Reference tray	Weight (kg/m)		Curvature Radius R (mm)	Dimension (mm)	
			Tray	Tray + Cover		A	B
50	100	KP BI10050	0,8	1,1	420	420	
	150	KP BI15050	0,9	1,4	420	420	
	200	KP BI20050	1,1	1,8	420	420	
80	100	KP BI10080	1,0	1,3	420	420	
	200	KP BI20080	1,7	2,5	420	420	
	300	KP BI30080	2,5	3,5	420	420	

### Pressed vertical elbow 90°



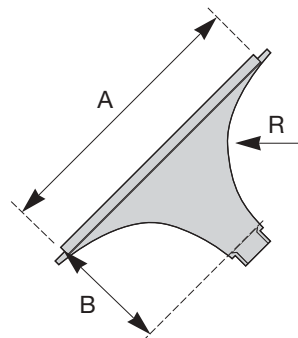
50	100	KP BI10050/P	0,4	0,6	250	250	280
	150	KP BI15050/P	0,5	0,7	250	250	280
	200	KP BI20050/P	0,6	1,0	250	250	280
80	100	KP BI10080/P	0,5	0,7	250	250	280
	200	KP BI20080/P	0,8	1,1	250	250	280
	300	KP BI30080/P	1,0	1,5	250	250	280

### Pressed small radius



50	100	KP SS10050/P	0,1	0,2	25	200	50
	150	KP SS15050/P	0,2	0,3	25	250	50
	200	KP SS20050/P	0,2	0,3	25	300	50

### Pressed large radius

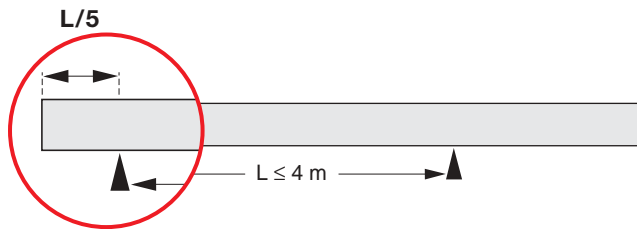


80	100	KP ST10080/P	0,7	1,1	250	600	250
	200	KP ST20080/P	0,9	1,5	250	700	250
	300	KP ST30080/P	1,1	1,8	250	800	250



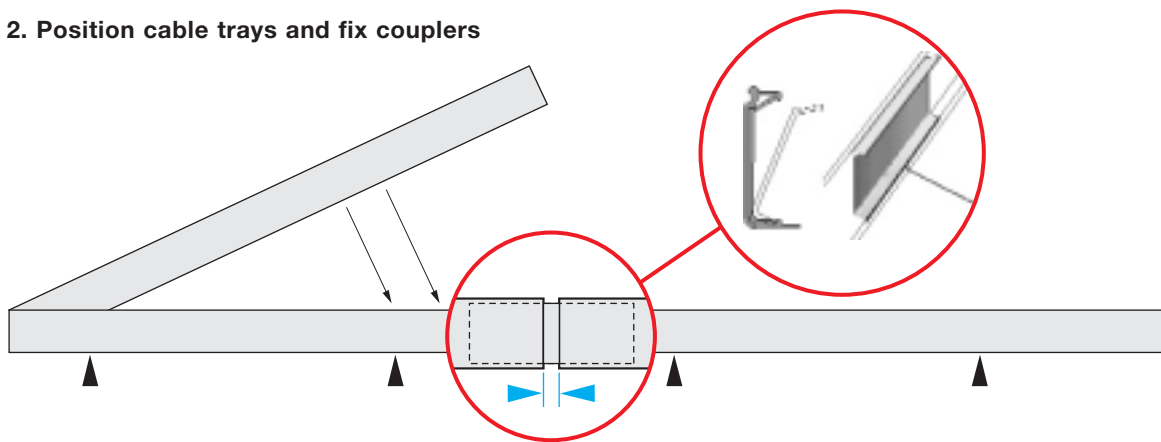
For a fast, safe installation :

1. Support the end of the cable tray at a maximal distance of L/5 in relation to the console



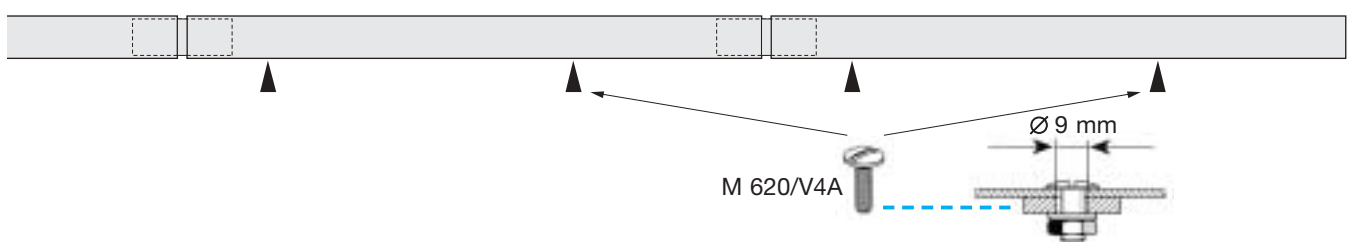
L/5 corresponds to the ideal place for mechanical stability. For distances between supporting pieces, greater than 4 m, it is necessary to take special precautions : please consult us in this instance.

2. Position cable trays and fix couplers



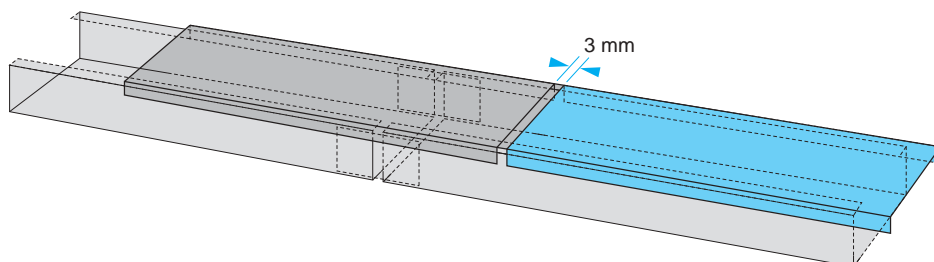
Thanks to a coupling system, the 2 lengths of cable trays position themselves automatically to allow for expansion.

3. Screw cable trays to the supports



To better allow for expansion, do not screw the cable tray to the supporting piece close to a junction.

4. In normal conditions (moderate loads or internally) clip the covers to the trays



To increase the rigidity, offset the junction of trays and covers.



In extreme conditions, surround cable trays and covers with ties to secure covers' fixing.

## Ebo Systems ...

## ...Challenging Time

January 1999 :

Composite cable trays Ebo Systems are chosen for the extension of the communication network of the Channel Tunnel.



Well co-ordinated production and logistic schedules guarantee the delivery of 52 km of cable tray in less than 3 months.

A close partnership helps to define and to develop a material without halogen, answering to the most stringent fire requirements :

BS476 part 7 : classe 1

BS476 part 6 : I<12

NFP 92-501 : M1

NFF 16-101 : IO, F0

low calorific power.

A product designed to reduce installation times and to minimise the cost of maintenance

- no corrosion sensitivity,
- reduced coupling costs thanks to 6 m lengths,
- Clip in couplers to speed installation.



### Attending to your needs

EBO teams are dedicated ensuring the success of your project. Our aim is to be available at all stages of a project, from design to installation, in order to propose the best technical and economic solutions.



### Dedicated solutions

Every project requires a solution. Ebo Systems is available to advise on all aspects of a project, taking in account dimensional constraints and material requirements.



### Continuous support

In order to ensure the optimal solution, Ebo Systems offers :

- an initial technical survey,
- on-going training, either in our own extensive facilities or on-site,
- technical advice on-site,
- continuous personal advice from design to installation.



### Logistical support

Ebo Systems keeps a large range of references permanently in stock which can be delivered quickly to site. Our logistics department can schedule planned deliveries to meet specific requirements.



### Quality control

Ebo Systems has been ISO 9001 qualified since 1994.

We commit to

- regularly assess our own suppliers for quality,
- verify their own technical data on their products, communicated by these regularly,
- systematically control materials entering our manufacturing process,
- continually look to improve our designs of products,
- 100% control of all critical stages of manufacture,
- do final control and inspection before despatch.



### Respect for the environment

Ebo Systems is committed to respect for the environment and is actively progressing towards ISO 14001 certification. All our products are zero halogen.





## Your Ebo system catalog



do not hesitate to complete  
your catalog with

## Corporate brochure and CD-Rom



## Technical catalogs



## Market application sheets



## Resin characteristics



### Head office

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e-mail : info@ebo-systems.com

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e-mail : info.prod@wanadoo.fr

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Fax +44 (0)1952 676639  
e-mail : ebosystemsint@ebo-systems.com

Visit our website : <http://www.ebo-systems.com>