CIPEC
Expansion Joints

DESIGN, BUILD, MAINTAIN

FREYSSINET
SUSTAINABLE TECHNOLOGY

CIPEC expansion joints

CIPEC expansion joints are designed to enable continuous traffic between two structures, accommodating structural movements due to creep, shrinkage effects, temperature variations and deformations under live load.
They are suitable for all reinforced concrete, prestressed concrete, composite and steel structures, and particularly for bridge decks.
CIPEC expansion joints are also designed to allow sufficient vertical movement so that bearings can be replaced without needing to disassemble the expansion joint.
They enable drainage of runoff water and they are designed to minimize traffic noise.

CONTENTS

CIPEC EXPANSION JOINTS

PRODUCT RANGE

The CIPEC range of expansion joints offers a suitable solution for all movements from 30 to 1000 mm, and regardless of the structure on which they are to be fitted, and installation and operating conditions.
The range includes:
- small movement expansion joints (JEP, WR and WOSd);
- medium movement expansion joints (Wd);
- large movement expansion joints (WP).

It also includes car park joints in the CIMAC family.

Movements	M<50	50≤M≤60	60≤M≤80	80≤M≤110	110≤M≤160	160≤M≤230	230≤M≤250	M >250
WP	-	-	-	-	-	-	WP250	WP*
Wd	-	Wd60	Wd80	Wd110	Wd160	Wd230	-	-
WOSd	-	WOSd50	WOSd75	WOSd100	-	-	-	-
WR	-	WR50	WR75	-	-	-	-	-
JEP	JEP3	JEP5	JEP8	-	-	-	-	-

Dimensions in mm. Up to 1000*

DESIGN

Road expansion joints resist sustained loads due to continuously increasing road traffic. They are also directly exposed to pollution, oil and dissolved road deicing salt.

The design of CIPEC road expansion joints and the nature of the materials used are optimised to resist all these aggressions, and they have a remark-ably long life.
The main elements of CIPEC expansion joints are:
- metallic elements,
- an anchor system,
- a continuous elastomer sealing section.

Metallic elements

Metallic elements may be made either from treated aluminium or hard drawn steel, and their surface area exposed to traffic is limited, thus limiting the loads applied to them.

Metallic elements of joints with medium and large movements have triangular or straight teeth that aid the user during installation and mitigate road noise, regardless of the joint opening distance.
These teeth may also be installed on skew bridges without introducing any stress on the expansion joints.

Anchor systems

CIPEC road expansion joints use one of the following two systems to anchor metallic elements to the structures to be equipped, depending on the model:
• either prestressed attachments,
• or a resin mortar bonding to the support (for the JEP) joint.

The elastomer section

A continuous elastomer section over the entire length of the road surface expansion joint is inserted between metallic elements. It prevents the penetration of foreign bodies and provides waterproofing against runoff water.
This section is installed underneath the surface layer and does not resist traffic loads.
Upstands of the elastomer section at the ends of the joint line also contribute to the leak tightness of the joint. A drain installed on the upstream side of the joint line also helps by collecting any water that infiltrates through the road surface layer.

QUALITY OF CIPEC EXPANSION JOINTS

A badly designed expansion joint, or simply a wrong choice of an expansion joint, can cause severe and irreversible disorders for itself and for the structures on which it is installed.
CIPEC joints are designed for quality, and are very much appreciated for the benefits that they provide as has been demonstrated on many structural projects for more than 30 years:
- excellent traffic comfort;
- long life;
- low noise;
- high resistance to corrosion;
- no horizontal reaction. Vertical movements of structures are possible (for jacking, etc.) without the need to disassemble the joint;
- protection of surfaces under the joint;
- good resistance to heavy duty and frequent traffic loads;
- adaptability to all surface structure types;
- easy installation on new or old structures;
- low servicing and maintenance

JEP EXPANSION JOINTS

DESIGN

These joints form part of the gap joints family. They are composed of two sections of drawn steel delivered in three-metre lengths and placed facing each other. These elements are equipped with two sinusoidal anchor parts cast into a resin-based mortar beam bonded to the structure.

The joint line is formed by a sequence of pairs of sections welded end to end.

SPECIAL FEATURES

The JEP joint is installed within the thickness of the surface layer. It is quickly installed and because there are no recesses or drillings in the structure, the JEP joint is well suited for solving specific problems with the replacement of existing joints, work done lane by lane, renovations in which only short traffic interruptions can be accepted, and in which completion speed is all important.

Traffic can be allowed over the joint after three hours.

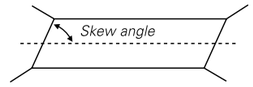
Since there are no teeth, JEP joints can accept small side movements with-out any change to their intrinsic qualities.

MOVEMENTS RANGE

The following table shows the capacity of JEP joints to accept movements as a function of the skew of the bridge:

Type	Straight (100 gr)	80 gr	60 gr	40 gr
JEP3	30	31.5	37	51
JEP5	50	52.5	62	85
JEP8	80	84	99	136

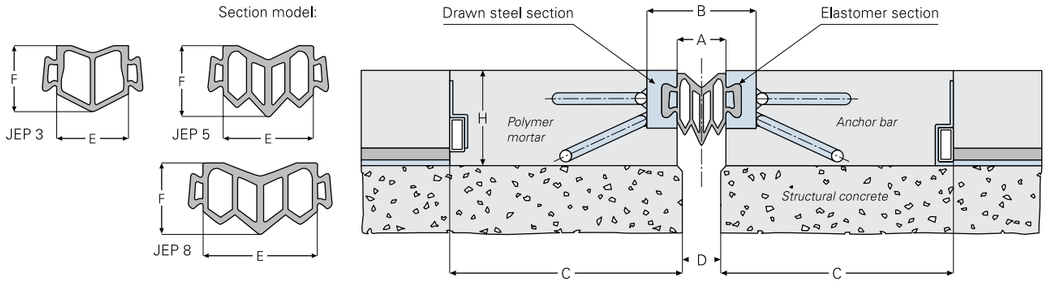
Dimensions in mm.



TECHNICAL DATA

Type	ØL	A min.	A max.	B min.	B max.	D min.	D max.	H	C	E	F
JEP3	30	30	60	80	110	10	40	80	140	60	55
JEP5	50	25	75	75	125	10	60	80	140	75	59
JEP8	80	25	105	75	155	10	90	80	140	95	59

Dimensions in mm.



ACCESSORIES

The following accessories are available to make the surface layer completely watertight at the joint and to make the action of the joint effective over the footpath (and other areas not carrying traffic):

- pavement joints - *figure1*;
- end section upstands - *figure 2;*
- drain.

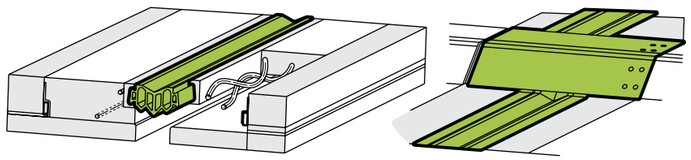


Fig. 1 : Detail of the footpath joint. Right: kerb cover plate.

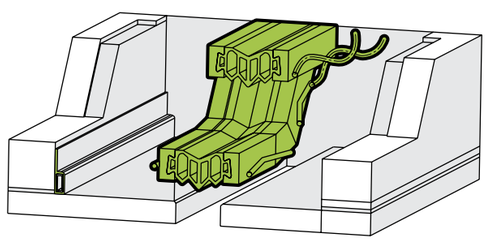
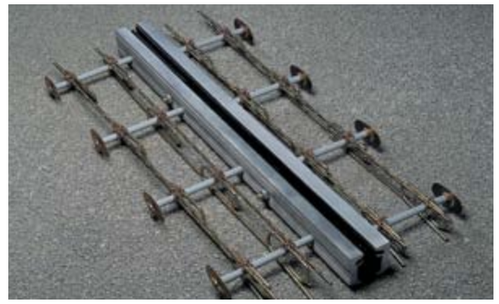


Fig. 2 : Details of section upstand.

WR EXPANSION JOINTS

DESIGN

These joints form part of the gap joints family. They are composed of two ex-truded aluminium alloy sections delivered in three-metre lengths and placed facing each other.
These elements are anchored by a series of attachments slightly inclined in reinforced microconcrete beams and fixed to structures by continuity bars.
A series of pairs of sections installed end-to-end forms the line of the joint.



SPECIAL FEATURES

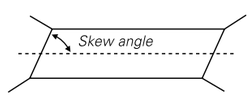
The WR joint is installed within the thickness of the surface layer. It is installed quickly and the fact that there are no recesses in the structures makes the WR a particularly economic joint.
It is suitable for new work or renovation work.

MOVEMENTS RANGE

The following table shows the capacity of WR joints to accept movements as a function of the skew of the bridge:

Type	Straight (100 gr)	80 gr	60 gr	40 gr
WR50	50	52,5	62	85
WR75	75	79	92	127

Dimensions in mm.

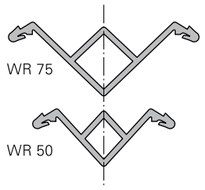


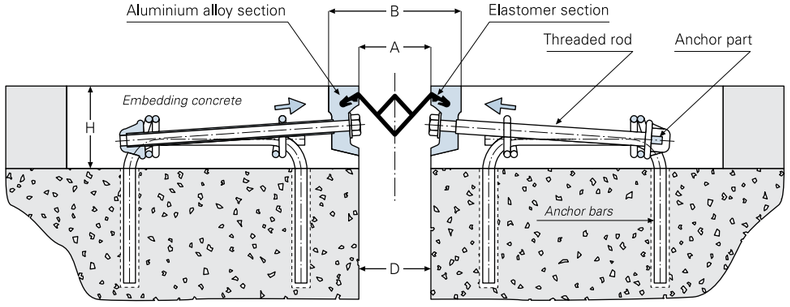
TECHNICAL DATA

Type	ØL	A min.	A max.	B min.	B max.	D min.	D max.	H
WR50	50	15	65	65	115	15	65	70
WR75	75	15	90	65	140	15	90	70

Dimensions in mm.

Section models:





ACCESSORIES

The following accessories are available to make the surface layer completely watertight at the joint and to make the action of the joint effective over the footpath (and other areas not carrying traffic):

- footpath joints - *table 1, figures 1 and 2*;
- end section upstands - *figure 3* + kerb cover plate - *figure 4*;
- drain.

Type	Model	A min.	A max.	B min.	B max.	C	H
WR50	TR50	15	65	65	115	150	100
WR75	TR75	15	90	65	140	150	100

Tab. 1: Types and models of footpath joints.

Dimensions in mm.

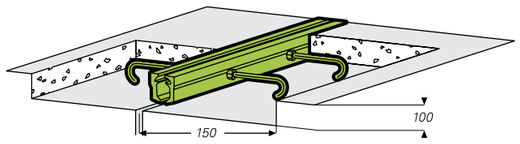


Fig. 1: Detail of the footpath joint.

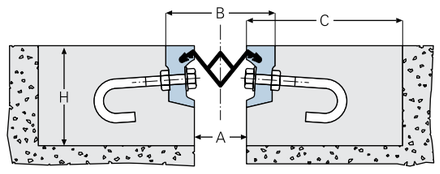


Fig. 2: TR type footpath joint.

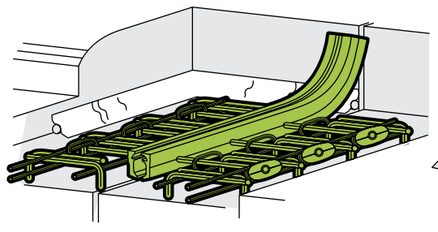


Fig. 3: Detail of the section upstand.

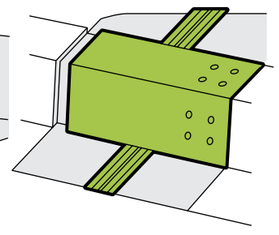


Fig. 4: Kerb cover plate.

WOSd EXPANSION JOINTS

DESIGN

These joints form part of the gap joints family. They are composed of two extru-ded aluminium alloy sections delivered in three or six-metre lengths and placed facing each other.
A series of pairs of sections installed end-to-end forms the line of the joint.
The metallic elements are anchored to the structure by fasteners.

SPECIAL FEATURES

WOSd joints may easily be removed if necessary, since the anchor bolts are easily accessible and due to the method of fastening the elastomer section.

The shape of the elastomer section and its position slightly below the surface enables systematic elimination of debris simply by suction caused by passing vehicles. It is easy to lift WOSd joints if resurfacing is carried out.

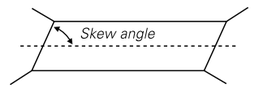
WOSd joints can accept any amount of skew without any change to their intrinsic qualities, since there are no teeth.

MOVEMENTS RANGE

The following table shows the capacity of WOSd joints to accept movements as a function of the skew of the bridge:

Type	Straight (100 gr)	80 gr	60 gr	40 gr
WOSd50	50	52.5	62	85
WOSd75	75	79	92	127
WOSd100	100	105	123	170

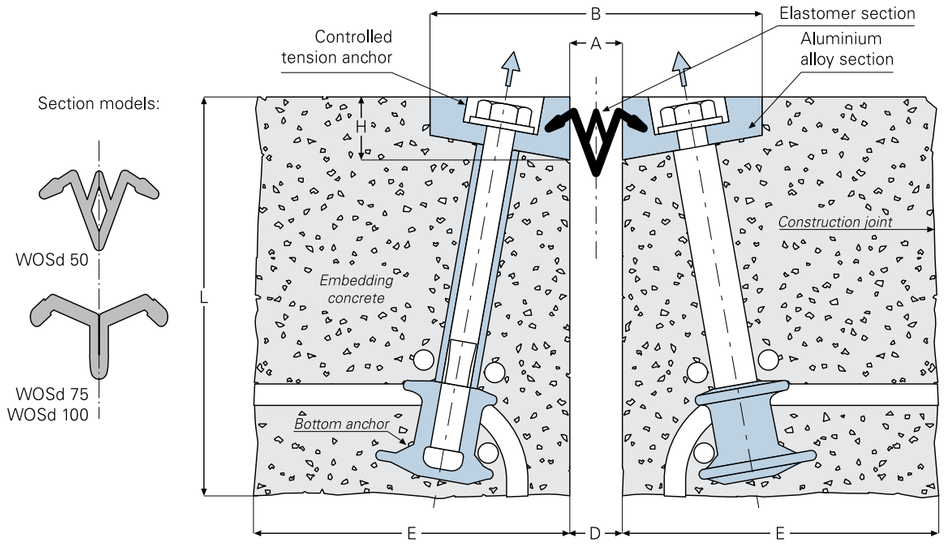
Dimensions in mm.



TECHNICAL DATA

Type	A min.	A max.	B min.	B max.	D min.	D max.	H	Recesses E	Recesses L
WOSd50	15	65	146	196	15	65	28.5	150	200
WOSd75	0	75	150	225	12	87	30	150	200
WOSd100	0	100	150	250	12	112	30	150	200

Dimensions in mm.



ACCESSORIES

The following accessories are available to make the surface layer completely watertight at the joint and to make the action of the joint effective over the footpath (and other areas not carrying traffic):

- pavement joints - *table 1 and figure 1;*
- end section upstands + kerb cover plate - *figures 2 & 3;*
- drain.

Type	Model	A	B	C	D min.	D max.	H
WOSd50	TO50	65.5	200	200	15	65	70
WOSd75	TO80	75	200	200	0	80	70
WOSd100	TO100	75	200	200	0	100	70

Dimensions in mm.

Tab. 1: Types and models of footpath joints.

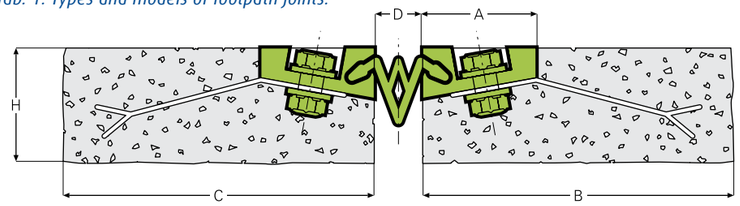


Fig. 1: Footpath joint type TO.

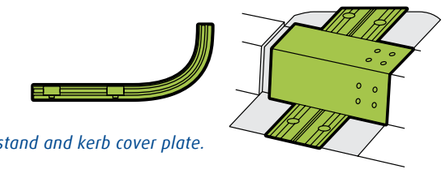


Fig. 2 & 3: Details of the section upstand and kerb cover plate.

Wd EXPANSION JOINTS

DESIGN

These joints form part of the cantilevered teeth expansion joints family.

They are composed of pairs of independent elements with triangular teeth made of cast aluminium alloy, delivered in one-metre lengths and placed facing each other. A series of pairs of elements installed end-to-end forms the joint line.

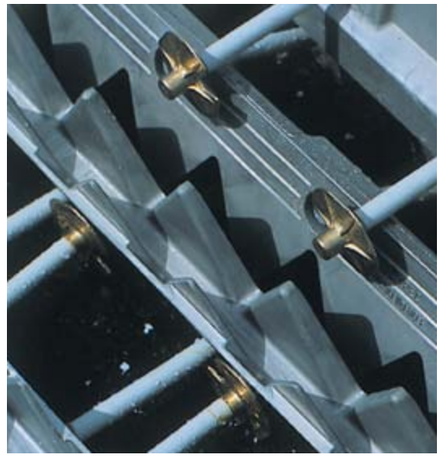
The metallic elements are anchored to the structures.

SPECIAL FEATURES

Wd joints are exceptionally robust as a result of the principle used to connect metallic elements to structures based on the choice of materials used, and a controlled method of installation.

They are designed for heavy and frequent traffic.

The triangular teeth of the metallic elements enable operation with no gap and thus enable perfect traffic continuity with a significant reduction in traffic noise over the joint, regardless of its opening dimension.



The easy access to anchor bolts and the short length of the elements facilitate maintenance and removal of the Wd joint without interrupting traffic, except on the lane being repaired.
Wd joints accept a skew of 30 gr without any change to their intrinsic qualities.



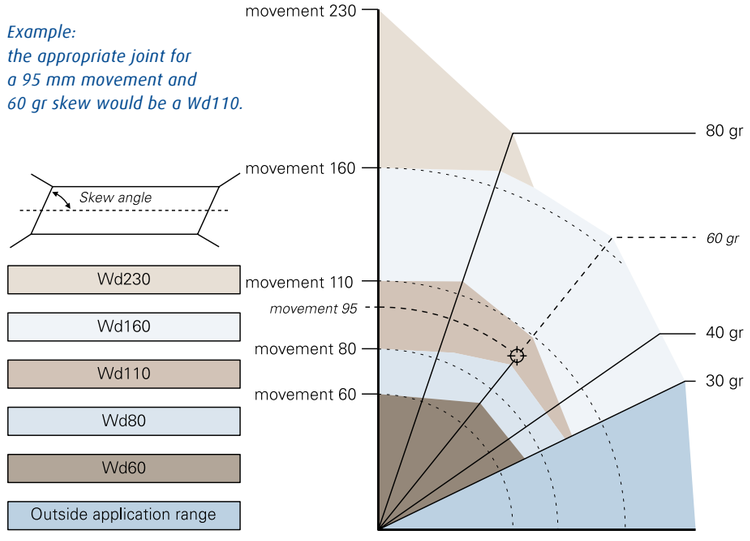
MOVEMENTS RANGE

The following table shows the capacity of Wd joints to accept movements as a function of the skew of the bridge:

Type	Straight (100 gr)	80 gr	60 gr	40 gr	30 gr
Wd60	60	61	71	66	67
Wd80	80	84	92	85	86
Wd110	110	116	104	92	90
Wd160	160	169	158	141	139
Wd230	230	185	127	102	97

Dimensions in mm.

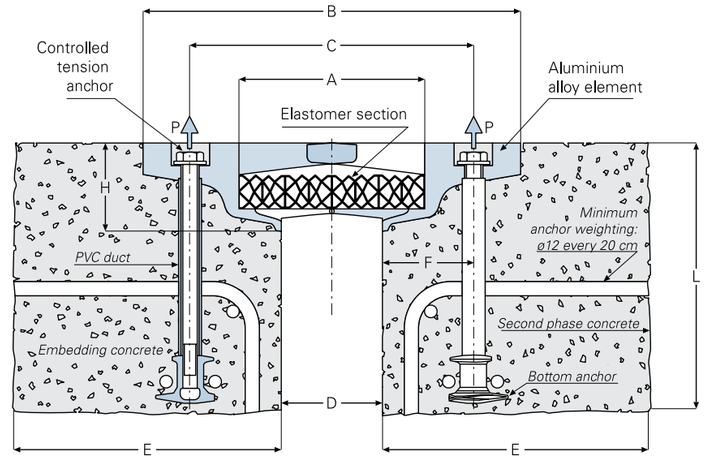
Example:
the appropriate joint for a 95 mm movement and 60 gr skew would be a Wd110.



TECHNICAL DATA

										Recesses		*Attachments*		
Type	**A min.**	**A max.**	**B min.**	**B max.**	**C min.**	**C max.**	**D min.**	**D max.**	**H**	**E**	**L**	**F**	**P (kN)***	**Nb****
Wd60	65	125	185	245	125	185	20	80	55	200	200	52.5	65	5
Wd80	90	170	220	300	155	235	30	110	57	200	200	62.5	65	6
Wd110	120	230	300	410	210	320	40	150	82	250	250	85	100	5
Wd160	170	330	400	560	290	450	50	210	98	300	280	120	190	4
Wd230	240	470	540	770	420	650	70	300	123	350	280	175	190	5

*Dimensions in mm. * P(kN) = tension forces per attachment. ** Nb = Number of attachments per element.*



ACCESSORIES

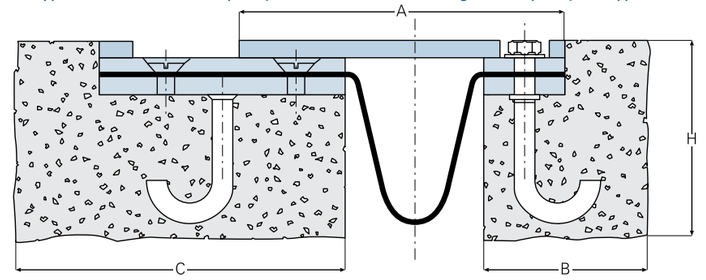
The following accessories are available to make the surface layer completely watertight at the joint and to make the action of the joint effective over the footpath (and other areas not carrying traffic):
- footpath joints - *table 1 and figures 1 & 2* (following page);
- end section upstands + kerb cover plate - *figure 3* (following page);
- drain.

Type	Model	A	B	C	D min.	D max.	H
Wd60	TO80	75	200	200	5	65	70
Wd80	TO80	75	200	200	5	85	70
Wd110	PL110	200	100	200	40	150	120
Wd160	PL160	260	100	250	50	210	120
Wd230	PL230	350	100	320	70	300	120

Dimensions in mm.

Tab. 1: Types and models of footpath joints.

Fig. 1: Footpath joint type PL.



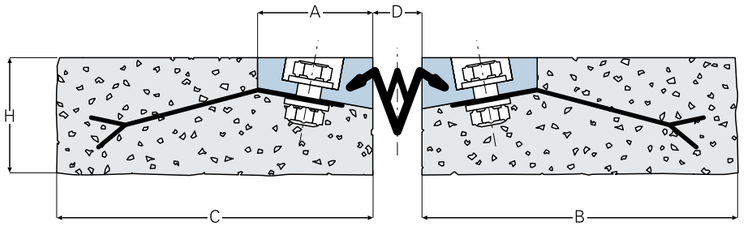


Fig. 2: Footpath joint type TO.

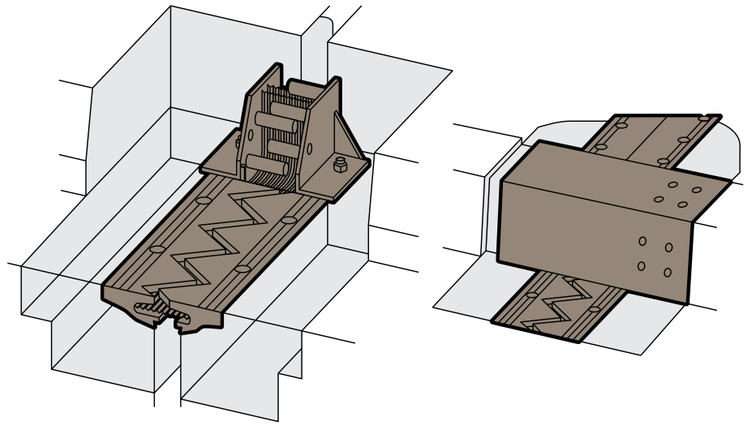


Fig. 3: Details of section upstand & kerb cover plate.

WP EXPANSION JOINTS

DESIGN

These joints form part of the cantilevered teeth expansion joints family. They are composed of pairs of independent elements with parallel teeth delivered in onemetre lengths and placed facing each other.
These teeth are cut from a rolled steel plate, or cast from aluminium alloy.

A series of pairs of elements installed end-to-end forms the joint line. Metallic elements are anchored to structures using controlled tightness fasteners.

The WP joint may be used with a system for recovering runoff water.
This system is composed of a continuous elastomer looped membrane over the entire length of the joint line or two elastomer membranes with a gutter located under the joint.

SPECIAL FEATURES

WP joints are made on request and may be adapted to the direction of displacement of the structure, either straight *(figure 1)* or skew *(figure 2)*.

Their capacity may vary from 250 to 1000 mm depending on the model.

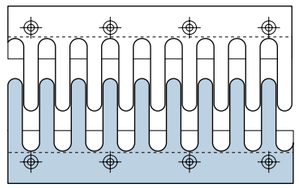


Fig. 1

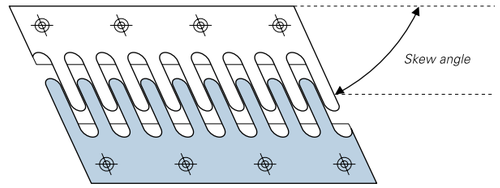
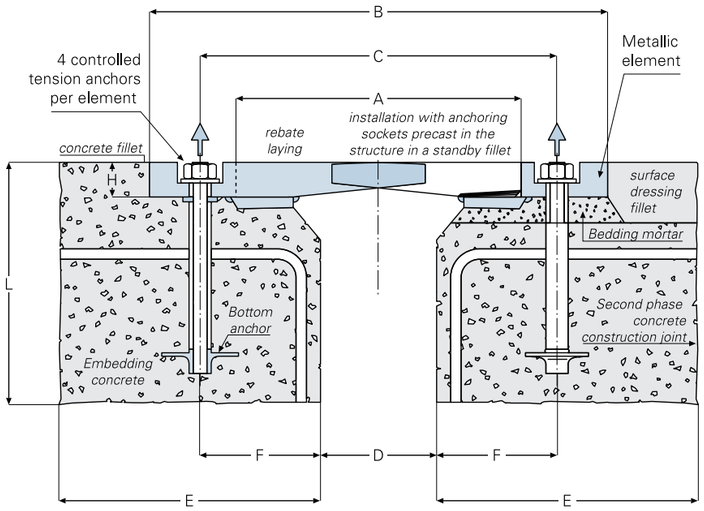


Fig. 2

TECHNICAL DATA



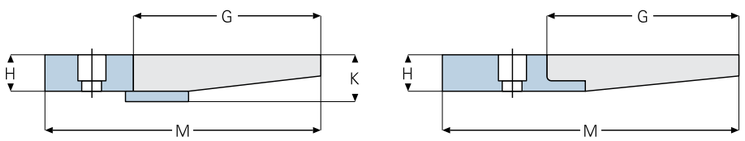
									Metallic elements					*Recesses*	
Steel type	**A min.**	**A max.**	**B min.**	**B max.**	**C min.**	**C max.**	**D min.**	**D max.**	**G**	**H**	**K**	**M**	**E**	**F**	**L**
WP250	270	520	510	760	370	620	50	300	260	50	64	380	270	160	350
WP300	320	620	590	890	410	710	50	350	310	50	64	445	310	180	350
WP350	370	720	650	1000	470	820	50	400	360	60	74	500	340	210	350
WP400	420	820	740	1140	540	940	50	450	410	65	79	570	390	245	350
WP450	470	920	810	1260	550	1000	50	500	460	65	79	630	420	250	350
WP500	520	1020	890	1390	610	1110	50	550	510	70	84	695	460	280	350
WP550	570	1120	960	1510	670	1220	50	600	560	75	89	755	500	310	350
WP600	620	1220	1020	1620	720	1320	50	650	610	85	99	810	530	335	350

Dimensions in mm.

										Metallic elements				*Recesses*	
Aluminium type	**A min.**	**A max.**	**B min.**	**B max.**	**C min.**	**C max.**	**D min.**	**D max.**	**G**	**H**	**K**	**M**	**E**	**F**	**L**
WP200	220	420	430	630	310	510	50	250	210	52	-	315	-	130	350
WP250	270	520	570	820	380	630	50	300	260	75	-	410	-	165	350
WP300	320	620	620	920	430	730	50	350	310	75	-	460	-	190	350

Please call us for models with more than 600 mm movement.

Dimensions in mm.



Above: standard WP. Adjacent: aluminium alloy WP.

COLLECTION OF WATER

Basic WP joints may be used with a runoff water collection system (type 1- *figure 1*).

This system is composed of:

- a continuous elastomer looped membrane under the entire length of the joint line (type 2 - *figure 2*) ;
- an elastomer section inserted between the metallic elements (type 3 - *fig. 3*) ;
- two membranes made of elastomer used with a gutter placed under the joint (type 4 - *figure 4*).

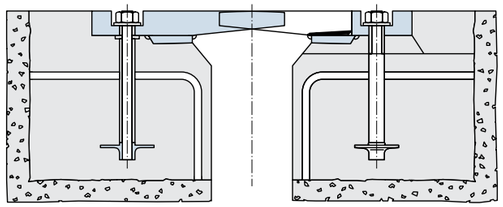


Fig. 1: Basic type.

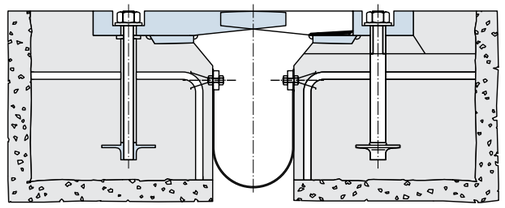


Fig. 2: Type 2 with looped membrane.

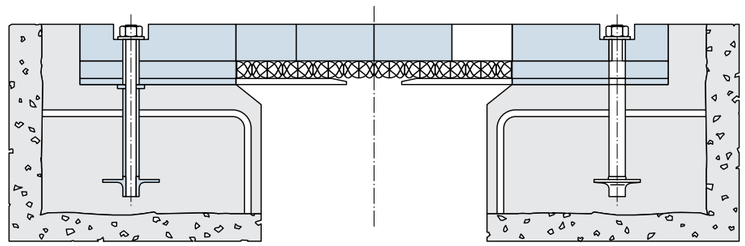


Fig. 3: Type 3 with elastomer section.

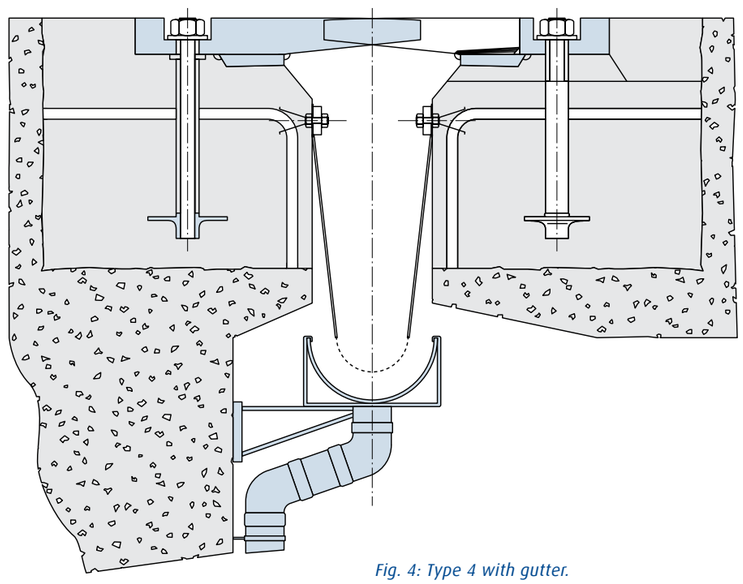


Fig. 4: Type 4 with gutter.

ACCESSORIES

The following accessories are available to make the surface layer completely watertight at the joint and to make the action of the joint effective over the footpath (and other areas not carrying traffic):

- footpath joints (with or without water recovery membrane) - *table 1 et figure 1 & 2* ;
- drain.

	Metallic elements		*Recesses*		
Type	**E**	**F**	**B**	**C**	**H**
WP200	280	250	400	200	150
WP250	320	300	450	200	150
WP300	380	350	500	200	150
WP350	420	400	550	200	150
WP400	500	450	600	200	150

Dimensions in mm.

Table 1: Types and models of footpath joints.

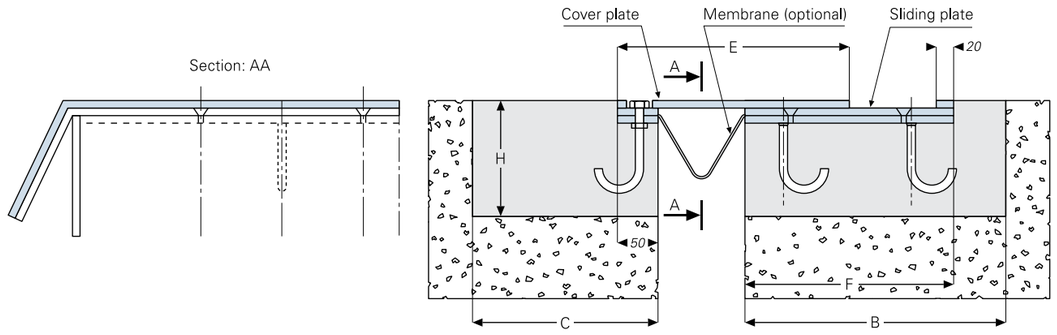


Fig. 1: Footpath joint.

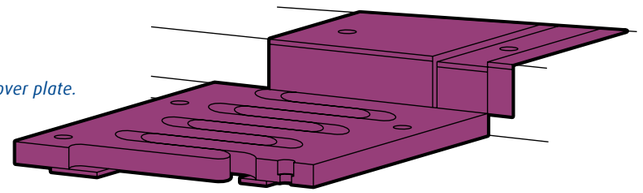


Fig. 2: Kerb cover plate.

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