



RUBBER ELASTOMERIC JOINTS

# EXPANSION JOINTS





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Pol. Ind. Santiago Payá, C/ Filà Benimerins, 32  
03802 ALCOY (Alicante) España-Spain-Espagne  
Tlf: +(34) 96 552 09 50 • Fax: +(34) 96 553 04 98  
e-mail: [info@cauchoverdu.com](mailto:info@cauchoverdu.com)  
[www.cauchoverdu.com](http://www.cauchoverdu.com)

## EXPANSION JOINTS



### 1. RUBBER ELASTOMERIC JOINTS

The reinforced elastomeric joint is a device which allows relative movements between two parts of a structure. To succeed, a joint must accomplish the following functions:

- Assure freedom of deck's movements.
- Provide continuity to the wearing course and be capable to support the traffic loads.
- Be able to avoid noise, impacts and vibrations.
- Have good sealing properties and allow good surface water evacuation.

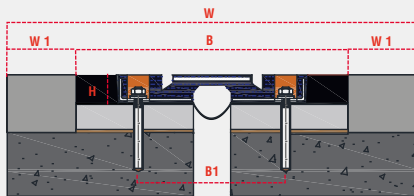
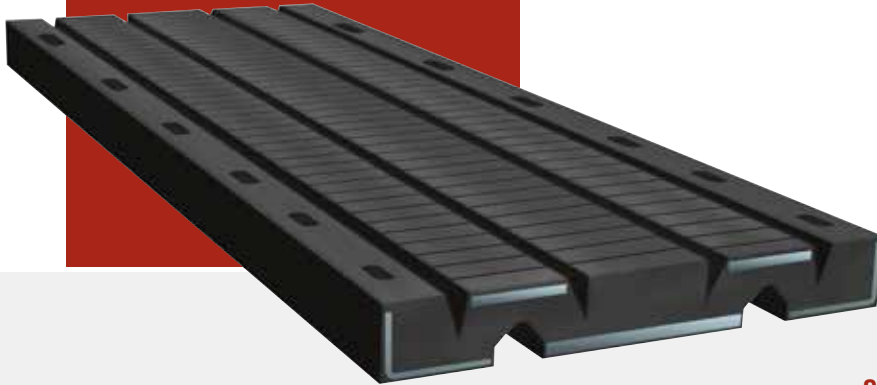
#### Description

The basic construction of these Reinforced Elastomeric Joints is molded chloroprene Rubber reinforced with steel. This elastomeric band is formulated to provide elasticity, strength and durability. Metal reinforcements made of steel are inside it, providing the stiffness and strength required to transfer traffic loads and avoid its bending when absorbing movements. The set is anchored to the structure by bolts. The steel anchoring bolts are fastened to the structure with epoxy resins and tightened by zinc washers and self-locking nuts. Once the mechanical fixing is placed, they are sealed in order to provide continuity to the wearing course.



**RUBBER  
ELASTOMERIC JOINTS**

# EJV



## Specific features

- Multipurpose expansion Joints available for medium and high structural gaps. They ensure a high degree of reliability and robustness of the system.
- Suitable for light and heavy traffic.
- Easy installation and maintenance.

DESCRIPTION	EJV-42	EJV-52	EJV-70	EJV-80
Weight module (kg)	28.6	34	50	72.6
Movement	±21	±26	±35	±40
<b>B</b> Width	245	270	355	425
<b>H</b> Height	35	40	46	53
<b>G</b> Gap	35	50	87	86
Length	1835	1835	1835	1835
<b>W</b> Cutting width (mm)	365	390	495	585
<b>W1</b> Transition strip (mm)	120	120	140	160
<b>B1</b> Distance between bolts. Horizontal (mm)	190	220	280	325
Distance between bolts. Longitudinal (mm)	305	305	305	305

### ANCHOR SYSTEM

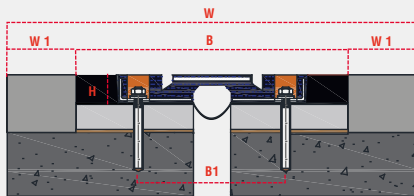
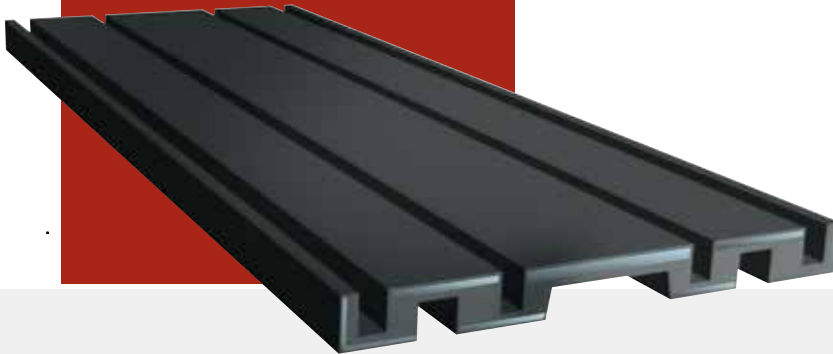
<b>M1</b> Ø Drill (mm)	16	16	18	20
<b>M</b> Bolt	M14	M14	M16	M18
<b>Wh</b> Washer	35x45x3.5 Ø17	35x45x3.5 Ø17	35x45x3.5 Ø17	50x60x5.0 Ø18
<b>P</b> Depth (mm)	200	200	200	200
Torque (N.m)	60	60	100	100

DESCRIPTION	EJV-100	EJV-130	EJV-160	EJV-230	EJV-330
Weight module (Kg)	125.4	134	209.4	304.4	431.2
Movement	±50	±65	±80	±115	±165
<b>B</b> Width	580	580	715	890	1190
<b>H</b> Height	56	56	75	93	128
<b>G</b> Gap	100	120	140	160	200
Length	1835	1835	1835	1835	1240
<b>W</b> Cutting width (mm)	740	740	895	1090	1430
<b>W1</b> Transition strip (mm)	160	160	180	200	240
<b>B1</b> Distance between bolts. Horizontal (mm)	494	500	619	787	1080
Distance between bolts. Longitudinal (mm)	500	305	305	305	305

### ANCHOR SYSTEM

<b>M1</b> Ø Drill (mm)	20	20	22	24	26
<b>M</b> Bolt	M18	M18	M 20	M 22	M24
<b>Wh</b> Washer	50x60x5.0 Ø18	50x60x5.0 Ø22	50x70x5.0 Ø17	50x70x6.0 Ø25	60x70x6.0 Ø25
<b>P</b> Depth (mm)	200	200	200	150	200
Torque (N.m)	100	120	200	200	200

# VF



## Specific features

- Multipurpose expansion Joints available for medium and small structural gaps Suitable for light and medium traffic.
- Easy installation and maintenance.
- Cost-saving solution.

DESCRIPTION	VF -50	VF -80	VF -110	VF -140	VF -180
Weight module (kg)	29.4	41.4	61	84	115
Movement	±25	±40	±55	±70	±90
<b>B</b> Width	240	274	356	432	470
<b>H</b> Height	35	40	46	54	66
<b>G</b> Gap	40	55	70	85	105
Length	1835	1835	1835	1835	1835
<b>W</b> Cutting width (mm)	360	394	496	592	650
<b>W1</b> Transition strip (mm)	120	120	140	160	180
<b>B1</b> Distance between bolts. Horizontal (mm)	190	220	279	342	390
Distance between bolts. Longitudinal (mm)	305	305	305	305	305

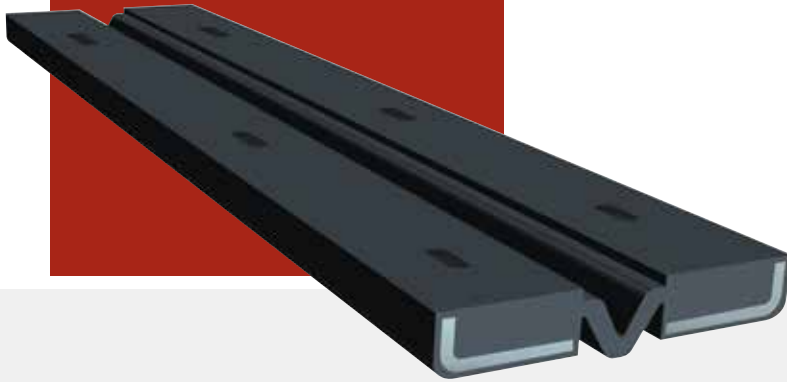
### ANCHOR SYSTEM

<b>M1</b> Ø Drill (mm)	16	16	18	20	20
<b>M</b> Bolt	M14	M14	M16	M16	M20
<b>Wh</b> Washer	35x45x3.5 Ø17	35x45x3.5 Ø17	40x50x3.5 Ø18	40x50x4.0 Ø18	40x50x4.0 Ø22
<b>P</b> Depth (mm)	200	200	200	200	200
Torque (N.m)	100	100	100	140	140

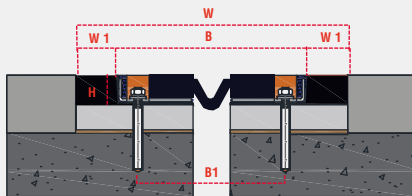
DESCRIPTION	VF -270	VF -330	VF -360
Weight module (kg)	281.2	360	420
Movement	±135	±165	±180
<b>B</b> Width	900	960	1200
<b>H</b> Height	76	80	107
<b>G</b> Gap	170	180	210
Length	1835	1000	1240
<b>W</b> Cutting width (mm)	1100	1280	1628
<b>W1</b> Transition strip (mm)	200	160	214
<b>B1</b> Distance between bolts. Horizontal (mm)	798	848	1100
Distance between bolts. Longitudinal (mm)	305	250	305

### ANCHOR SYSTEM

<b>M1</b> Ø Drill (mm)	22	22	26
<b>M</b> Bolt	M20	M20	M24
<b>Wh</b> Washer	51x72x6.0 Ø25	51x72x6.0 Ø25	51x72x6.0 Ø25
<b>P</b> Depth (mm)	200	170	200
Torque (N.m)	200	200	200



# VFB



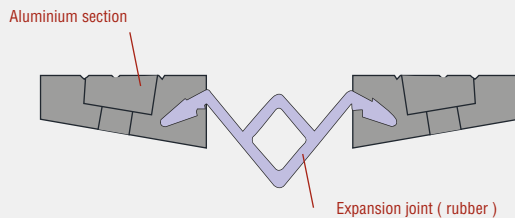
### Specific features

- Multipurpose expansion Joints available for small structural gaps.
- Suitable for light traffic.
- Easy installation and maintenance.

DESCRIPTION	VFB-50	VFB-75
Weight module (kg)	35	35
Movement	±25	±37.5
<b>B</b> Width	210	225
<b>H</b> Height	34	35
<b>G</b> Gap	43	55
Length	1750	1835
<b>W</b> Cutting width (mm)	330	345
<b>W1</b> Transition strip (mm)	120	120
<b>B1</b> Distance between bolts. Horizontal (mm)	150	145
Distance between bolts. Longitudinal (mm)	305	305
<b>ANCHOR SYSTEM</b>		
<b>M1</b> Ø Drill (mm)	16	16
<b>M</b> Bolt	M14	M14
<b>Wh</b> Washer	35x45x3.5 Ø17	35x45x3.5 Ø17
<b>P</b> Depth (mm)	200	200
Torque (N.m)	60	60

Each model has been carefully designed to bear extreme conditions of work. Every joint module has been put under long compression and expansion cycles, measuring the stress required to compress or expand the values for which each joint has been designed.

# CAE



## Specific features

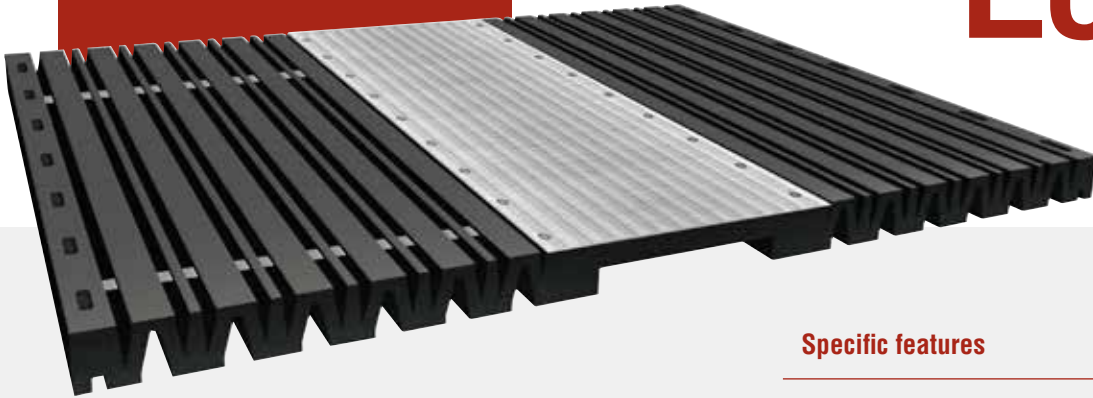
- Multipurpose expansion Joints available for medium and small structural gaps
- Suitable for light and medium traffic.
- Easy installation and maintenance.
- Long life and easy replacement of the rubber profile



DESCRIPTION	CAE-50
Weight module (kg)	32
Movement	± 50
Width	146 -196
Height	28,9
Gap	15 -65
Length	1000
Distance between bolts. Longitudinal (mm)	205
<b>ANCHOR SYSTEM</b>	
Ø Drill (mm)	12,5

Each model has been carefully designed to bear extreme conditions of work. Every joint module has been put under long compression and expansion cycles, measuring the stress required to compress or expand the values for which each joint has been designed.

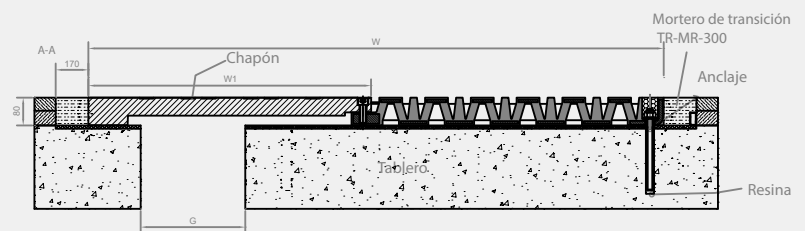
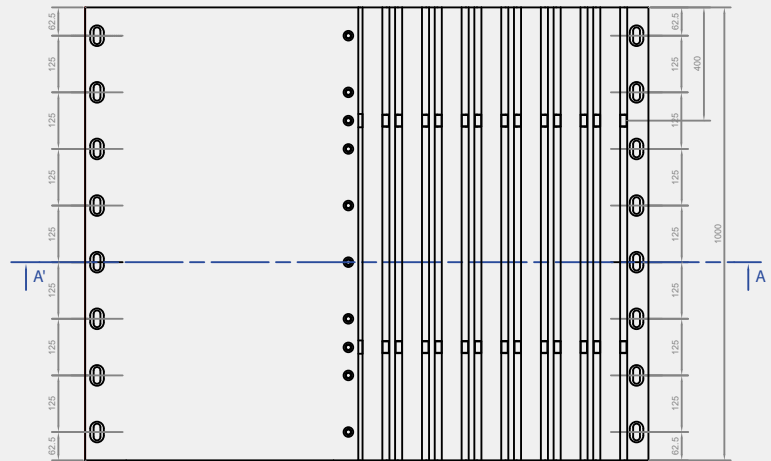
# EJM



## Specific features

- Extra long movements.
- Extra long structural gaps.
- The steel plate can be galvanized or covered by vulcanization.
- Easy installation by comparison with other devices.
- Seismic protection available

By combination of the different pieces (bellows and steel sheet) we can produce symmetric and asymmetric expansion Joints with the requested movements.



## DESCRIPTION

MOD	Recorr. (mm)	R. trans (mm)	L	H	W	W1	W2	Peso (kg)	CL	G	T	Mxb	Da
<b>EJM 500</b>	500 ( ± 200 )	284 ( ± 142 )	1200	85	1520	765	815	585	200	270	170	M20X200	22
<b>EJM 600</b>	600 ( ± 300 )	340 ( ± 170 )	1200	85	1760	875	955	710	200	320	170	M20X200	22
<b>EJM 700</b>	700 ( ± 350 )	410 ( ± 205 )	1200	85	2000	965	1095	860	200	370	170	M20X200	22
<b>EJM 800</b>	800 ( ± 400 )	490 ( ± 245 )	1200	85	2240	1065	955	1235	200	420	170	M20X200	22

Each model has been carefully designed to bear extreme conditions of work. Every joint module has been put under long compression and expansion cycles, measuring the stress required to compress or expand the values for which each joint has been designed.



## A. STRUCTURES LOCATION

Once in the work site, the structures will be located and the joint to be installed will be checked. Control if the bridges have already the last coat of asphalt and its thickness. The thickness of the asphalt is very important to see if the chosen type of joint can be installed.

Before starting the installation, at least we should check the following:

- Real thickness of the coating
- Alignment and gap in the structure.
- Geometry of abutments

All this facilitates installation without surprises, inconsequential cost and delay in installation and quality risks.



Lay out a ground plan for the joint and mark the cut width at both sides of the axis.

## B. CUTTING AND REMOVAL COATING.

Cut with a diamond cutting machine to the appropriate depth.

With the help of a compressor and breaking hammer extract the asphalt out between the cuts previously made. Next, the bottom surface of the box is properly prepared, by sandblasting or mechanical chipping off. The existing porexpan should be removed, blow the box in order to leave it clean of dust or any other object. We advise to brush the wall of the asphalt cut



- **W**  $\geq$  width expansion joint + 2\*height expansion joint. If there is a lateral drainage system, is needed increase the width cut.
- **H**  $\geq$  height expansion joint + 30 mm.



## VF

	VF -80	VF -110	VF -140	VF -180	VF -270	VF -330	VF -360
<b>H</b>	70	76	84	86	116	110	137
<b>W</b>	434	540	648	734	900	960	1200

## EJV

	EJV -42	EJV -52	EJV -70	EJV -80	EJV -100	EJV -130	EJV -160	EJV -230	EJV -330
<b>H</b>	65	70	76	83	85	85	116	126	157
<b>W</b>	245	270	367	453	596	810	900	900	1698

## VFB

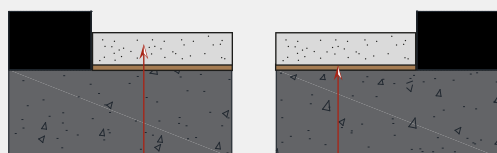
	VFB -50	VFB -75
<b>H</b>	34	35
<b>W</b>	210	220

## CAE-50

	CAE-50
<b>H</b>	29
<b>W</b>	146 to 196

## C. PREVIOUS TREATMENT OF THE BOTTOM SURFACES. HIGH STRENGTH MORTAR LEVELING

With special mortar of high strength and previous treatment of the bottom surfaces of the box with joining resins, a layer of structural leveling will be placed to reach a predetermined elevation, depending on the joint model to be installed.



Bedding mortar

Resin

About the previous treatment of the bottom surface, depends of the mortar used, Caucho Industrial Verdú recommended the next products:

### Mortar of high strength

Mapefil

Mortero Assacem Planning

Masterflow MJ

### Resin

No required

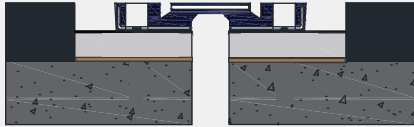
Assapox Fix

Masterflow Primer RG



## D. PLACEMENT OF MODULES

Once the mortar is set, the modules will be centered on the structural joint and the points where the anchoring are to be placed will be marked.



If the installation is with adjustment, will be needed calculate the clearance in the moment of the installation.

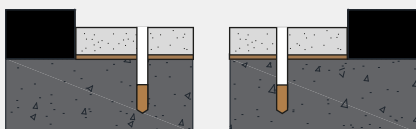
## E. PREPARING THE ANCHOR FIXING

The modules will be removed and the chemical anchoring of the bolts will be performed.

**The steps are as follow:**

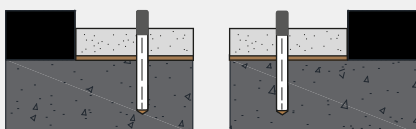
Make the drills in the deck, its diameter will be 2 mm greater than the diameter of the bolt.

Clear the holes with compressed air; once they have dried insert the resin caps and threaded rods to the required depth.



Ensure perfect alignment of the holes, longitudinally and transversely.

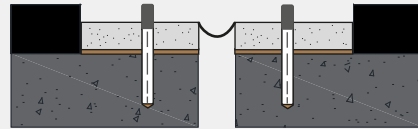
Mix the resin according to manufacturer's instructions. Pour the mixture into the holes up to a third of its depth and insert the bolt impregnated with the same mixture. Remove traces of resin overflow and check the perfect perpendicularity of the bolts.



## F. DRAINAGE

### Drainage gutter

Once the anchor system has been fixed, we should the drainage gutter, it will be fixed by the layer of resin



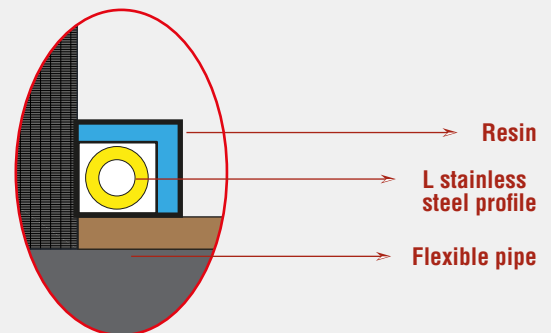
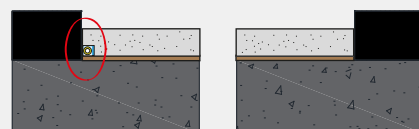
### Lateral drainage

If the expansion joint enclose a lateral drainage system, it will be installed before to make the bedding mortar.

This system will be installed in both of sides of the joints, if the bridge has a slope, the system only will be installed in the highest side.

**The system will be formed by:**

- Flexible pipe.
- Stainless steel L-shaped water drainage profile, to cover the flexible pipe.
- Resin.

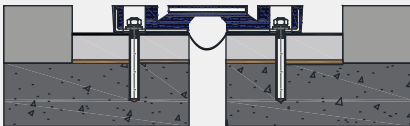




## G. TENSIONING THE ANCHORS

Once the anchoring is hardened, the modules will be placed again on their location.

Modules will be aligned and washers and nuts will be located on the bolts. Nuts will be adjusted with the appropriate tightening torque.



### VF

DESCRIPTION	VF -80	VF -110	VF -140	VF -180
<b>Torque (N.m)</b>	100	100	140	140

DESCRIPTION	VF -270	VF -330	VF -360
<b>Torque (N.m)</b>	200	200	200

### EJV

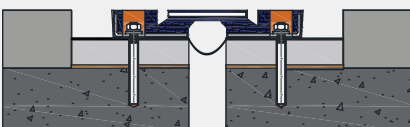
DESCRIPTION	EJV-42	EJV-52	EJV-70	EJV-80
<b>Torque (N.m)</b>	60	60	100	100

DESCRIPTION	EJV-100	EJV-160	EJV-230	EJV-330
<b>Torque (N.m)</b>	100	200	200	200

### VFB

DESCRIPTION	VFB-50	VFB-75
<b>Torque (N.m)</b>	60	60

Once completed, we will proceed to seal the heads of the anchors, it is cleaned carefully cavities where the anchors are housed and apply one of the following products:



**Assapur Flex**

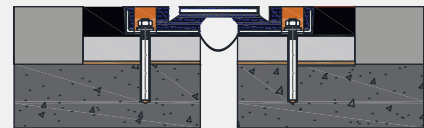
**EPOX-410-LUSAN**

**Master Flex**

## H. RIGID TRANSITIONS

Be sure that the asphalt walls and the module walls are completely clean and dry. Prime the asphalt walls and the module walls by using a brush or a roller. The three faces of each transition should be very well primed.

Before the priming is cured, prepare and apply the epoxy based product by mixing properly the epoxy resin with the siliceous arids. The epoxy resin will be applied by using a shovel (previously wet in solvent) in order to make easier the application. The resin must be very well leveled in relation to the module and the asphalt.



Various mortars can be used to implement the transition band. Depending on the product used will be necessary or not using a resin. Again, resin will be used when the manufacturer recommends.

Transition	Resin
Mapegrout	No required
Mortero Assacem Transición SR	Assapox Fix
Masterflow 145	Masterflow Primer RG

Once the mortar cured, transitions will be painted with pure resin and some carborundum will be spread. In order to accomplish a clean finish, a paper tape should be placed along the edges of the joint and all along the asphalt before painting the transitions. Those tapes will be removed once this task is finished.

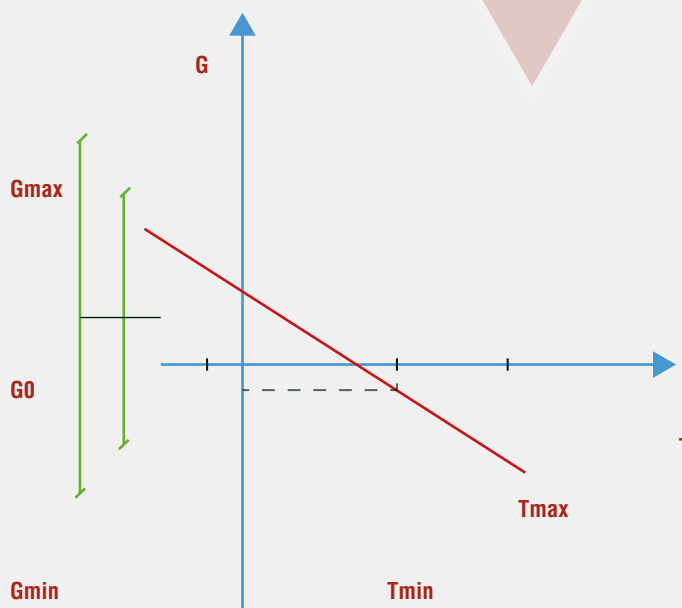


## I. ADJUSTMENT OF EXPANSION JOINTS

To optimize the choice of the expansion joint, is necessary have account the adjustment.

Basically the movements of the bridge are calculated in according to shrinkage, fluce and thermal effects.

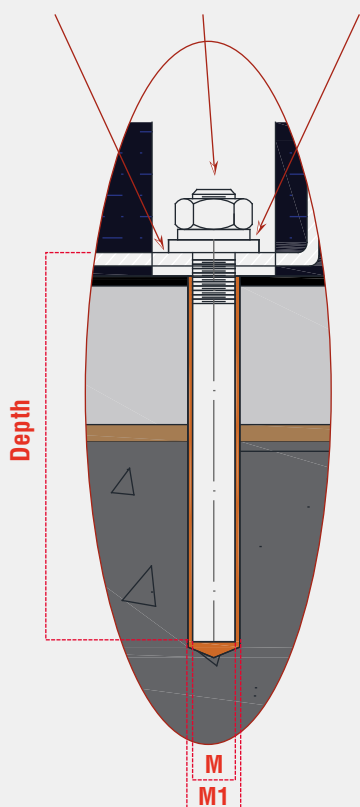
When the expansion joint is going to be installed, the tempe- ture and reologics effects will be differents from the values of designed.



**G<sub>0</sub>**, is the gap of the expansion joint in the moment of the installation.

## J. ANCHOR SYSTEM

Oval Washer    Hexagonal Nut    Plain Washer



DESCRIPTION	VF -80	VF -110	VF -140	VF -180
<b>M1</b> Ø Drill (mm)	18	18	18	18
<b>M</b> Bolt	M16	M16	M16	M16
<b>D</b> Depth (mm)	150	150	150	150
DESCRIPTION	EJV -42	EJV -52	EJV -70	EJV -80
<b>M1</b> Ø Drill (mm)	16	16	16	18
<b>M</b> Bolt	M14	M14	M14	M16
<b>D</b> Depth (mm)	150	150	150	150
DESCRIPTION	VF -270	VF -330	VF -360	
<b>M1</b> Ø Drill (mm)	26	22	26	
<b>M</b> Bolt	M24	M20	M24	
<b>D</b> Depth (mm)	170	170	170	
DESCRIPTION	EJV-100	EJV-16	EJV-100	EJV-100
<b>M1</b> Ø Drill (mm)	18	22	24	26
<b>M</b> Bolt	M16	M20	M22	M24
<b>D</b> Depth (mm)	150	150	170	200
DESCRIPTION	VFB -50	VFB -75		
<b>M1</b> Ø Drill (mm)	16	16		
<b>M</b> Bolt	M14	M14		
<b>D</b> Depth (mm)	150	150		

Hexagonal Nut	UNE 17066:1968
Oval Washer	UNE 17066:1968
Plain Washer	UNE 17066:1968
Bolt	UNE-EN 10083 -1:2008



Cutting and removal coating



Placement of modules



Preparing the anchor fixing



Tensioning the anchors



Rigid transitions



## NOTES

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Pol. Ind. Santiago Payá, C/. Filà Benimerins, 32  
03802 ALCOY (Alicante) España-Spain-Espagne  
Tlf: +(34) 96 552 09 50 • Fax: +(34) 96 553 04 98  
e-mail: [info@cauchoverde.com](mailto:info@cauchoverde.com)  
[www.cauchoverde.com](http://www.cauchoverde.com)

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03802 ALCOY (Alicante) España-Spain-Espagne  
Tlf: +(34) 96 552 09 50 • Fax: +(34) 96 553 04 98  
e-mail: [info@cauchoverdu.com](mailto:info@cauchoverdu.com)  
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