

We value:

- Innovation
- Efficiency
- Performance
- Reliability
- Care for people



Enterprise Policy



Exist by product quality, make progresses on the-innovation.
Strive for benefit with scientific management, unite to go right and forge ahead.



ORIENT RUBBER
OVM
东方橡胶

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BRIEF INTRODUCTION

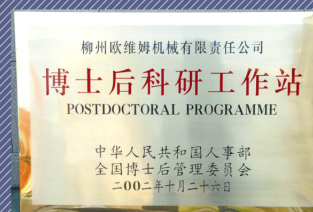
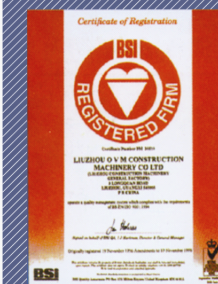


■ Liuzhou Orient Engineering Rubber Products Co.Ltd is specialized in the manufacture of engineering Rubber Products,which are widely applied in works of highways,railways,bridges, city viaducts and water conservanveys. The registered address of our company is No5. Ji aRoad , Liuzhou city, Guangxi, PRC. We have completed facilities and instruments for production and test,and have a annual productivity for various kinds of laminated Elastomeric Bearing about 200,000 picecs,Pot Rubber Bearings ,Spherical Steel Bearings about 25,000 sets, Expansion Joints 100,000 meters,and other engineering rubber products more than 6000 tons.

■ Our company established quality management system in accordance with ISO9001-2000, meanwhile has certified the registry of ISO9001 by CQC in 1995,and BSI (British Standard Institute) in 1996.We are the only organization possessing both two certificates in thisfield in China and the products quality is reliable .In strict compliance with standards JT/T4-2004、 JT391-1999 and JT/327-1997 issued by the Ministry of communication of PRC ,our company manufactures highway bridge plate rubber bearings , elastomeric pot bearing and expansion Joints.Our production may also comply with JIS , the Japan standard,AASHTO,as well as American standard,BS5400,EN1337.

■ During the past years , by cooperation with Huazhong University of Science and Technology ,Planning and Design Institute under the Ministry of communications , the Science Research Institute under the Ministry of Railway,the Shanghai Municipal Civil Design Institute and Tongji University , our products including laminated Rubber Bearings ,Pot-type Rubber Bearings , Expansion Joints, facilities have been subjected to inspection and test by the Communication Engineering Inspecting Center under the Ministry of Communications ,Construction Research Institute under Ministry of Railway.The Civil Engineering Inspecting Centerin Tongji University .The result satisfies the relevant standards domestically and internationally in this field . The products sell well in domestic market ,and also export to South Korea, Japan,Kingdom of Saudi Arabia ,Egypt,Tanzania,UAE,HongKong, Vietnam, Pakistan and other Southeast Asia countries and regions.Especially,we developed the Lead Rod Damping Seismic Bearing and Viscous Hydro-Damper,ect.The production of struction damping,already reached the international advanced level,they have been slathered in The Weihe Bridge in Sanxi province,especially in the Weihe Bridge project,the Lead Rod Damping Seismic Bearing has stood in great Wenchuan Earthquake and our ampany became the only one company that had such project achievement in the country.

■ Well hold on the principle of "Quality the First、 Customer the Priority " with high-class products and service to satisfy clients.



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XAMPLES OF ENGINEERING



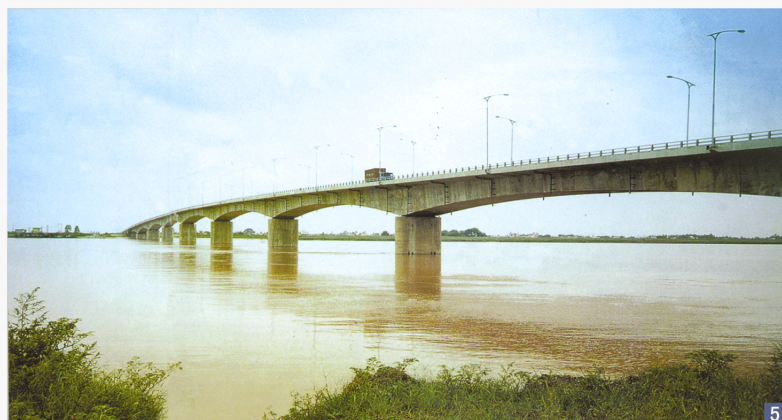
Changjiang bridge in Shutong, Jiangsu province, China



Nanning Bridge, China



Sanmenjiang Bridge in Liuzhou, China

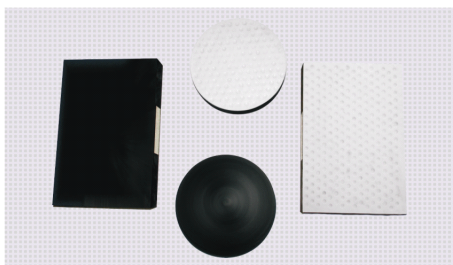


- 1 The Yajisha Bridge in Guangzhou, China
- 2 Special Highway at Xianyang international airport in Xian, China
- 3 Yangji Changjiang Bridge in Wuhan, China
- 4 The Albuha Bridge, Saudi Arabia
- 5 The New Duong Bridge, Vietnam



- 1 The YenLenh Bridge, Vietnam
- 2 Sheikh Maktoum Bridge
Ajman Project, U.A.E
- 3 Thuan Phuoc bridge, Vietnam
- 4 Cairo International Air port
(Terminal 3 Approach Bridge),
Egypt

Laminated Elastomeric Bearings for Highway Bridges



Physical Property Parameters of Rubber (According with Standard JT Industry of the Ministry of Communications)

Items		Polychloroprene rubber	Natural rubber
Hardness (IRHD)		60±5	60±5
Tensile strength (MPa)		≥17.0	≥18
Elongation at break (%)		≥400	≥450
Peel strength of rubber bonded to steel plate (KN/m)		>10	>10
Peel strength of rubber bonded to PTFE plate (KN/m)		>7	>7
Brittle temperature (°C)		≤-40	≤-50
Permanent deformation at constant compression (%) (70°C x 24h)		≤15	≤30
Ozone resistance aging (Testing conditions; 20% of elongation, 40°C x 96h)		100pphm	25pphm
		No cracks	No cracks
Hot air-oven ageing test	Testing conditions (°C x h)	100X70	70X168
	Reduction of tensile strength (%)	-15	-15
	Reduction of elongation at break (%)	-40	-20
	Hardness changeable range (IRHD)	0, +10	-5, +10
Applicable temperature range		-25°C~+60°C	-40°C~+60°C

Mechanical Property Parameters of the Laminated Elastomeric Bearing (According with Standard JT Industry of the Ministry of Communications)

Items		Specifications	Note
Limited compressive strength (MPa)		70	$G=1$ $E=5.4G \cdot S^2$ For rectangular bearing $S = \frac{(la-10) \times (lb-10)}{2 \times [(la-10) + (lb-10)] \times t}$ For circular bearing $S = \frac{d-10}{4t}$ Where, S-Shape factor la-Shorter dimension of rectangular bearing (mm) lb- Longer dimension of a rectangular bearing (mm) t-Total nominal thickness of bearing (mm) d-Overall diameter of circular bearing (mm)
Compressive elasticity modulus E (MPa)		$E \pm E \times 20\%$	
Shear elasticity modulus G (MPa)		$G \pm G \times 15\%$	
Minimum tolerable angle rotation tangent tg θ	Reinforced steel concrete bridge	≥1/300	
	Steel bridge	≥1/500	
Friction coefficient between pure PTFE plate and stainless steel μ f		≤0.03	

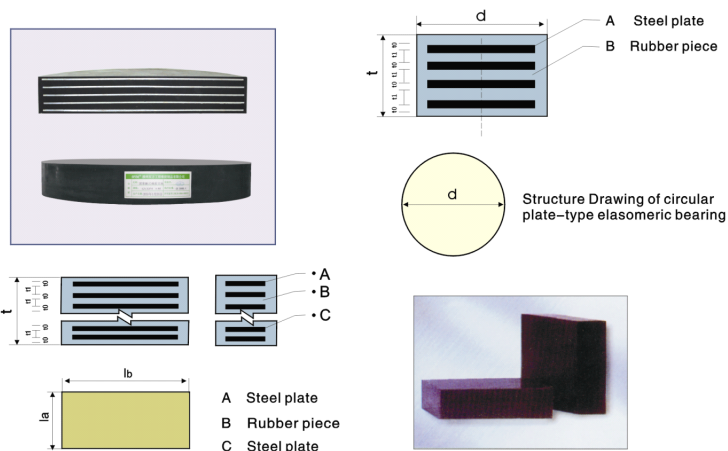
Physical Property Parameters of Rubber (According with Standard AASHTO)

Items		Polychloroprene rubber			Natural rubber		
Hardness (IRHD) ASTM D2240		50±5	60±5	70±5	50±5	60±5	70±5
Tensile strength (MPa) ASTM D412		≥15.5			≥15.5		
Elongation at break (%) ASTM D412		≥400	≥350	≥300	≥400	≥400	≥300
Peel strength of rubber bonded to steel plate (KN/m) D429,B		≥7.0			≥7.0		
Low temperature brittleness (°C) ASTM D746		≤-40			≤-40		
Permanent deformation at constant compression (%) ASTM D395		100°C x 22 h			70°C x 22 h		
		≤35			≤25		
Ozone resistance ageing 100pphm, 20% (38°C x 100h) of elongation ASTM D1149		100pphm			25pphm		
		No cracks			No cracks		
Hot air-oven ageing test ASTM D573	Testing conditions (°C x h)	100°C x 70 h			70°C x 168 h		
	Reduction of tensile strength, Maximum (%)	-15			-25		
	Reduction of elongation at break, Maximum (%)	-40			-25		
	Hardness changeable range, Maximum Points (IRHD)	15			10		

Rectangular and Circular Laminated Elastomeric Bearings

GJZ series rectangular and GYZ series circular plate-type elastomeric bearings are the simplest ones in structures but characterized with:

1. Sufficient vertical rigidities to bear perpendicular load and to transmit the counterforce of the upper structures to the piers.
2. Good flexibilities to adapt the rotation of beam ends.
3. Considerable shear deformations to satisfy the horizontal displacement of the upper structures.
4. Perfect antivibration function to reduce the impact of dynamic load acting on spanstructures and piers of Bridges.



Structure Drawing of Rectangular Laminated Elastomeric Bearing

- t – Total nominal thickness of bearing
 t₁ – Thickness of rubber piece in the mediate layer
 t₀ – Thickness of single-laminated steel plate
 la – Shorter dimension of rectangular bearing
 lb – Longer dimension of a rectangular bearing

Unit: (In mm)

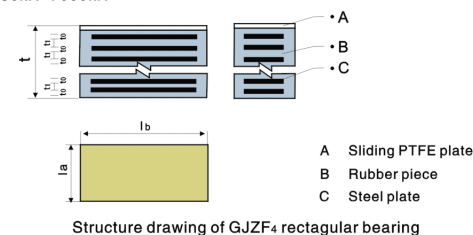
Interpretation for Tokens of Laminated Elastomeric Bearings(JT Satandard)

Name	GJZ rectangular bearings for highway bridges GYZ Circular bearings for highway bridges
Type	F ₄ (added here stamds for sliding PTFE bearings)
Specification	Rectangular la × lb × t (mm) Circular d × t (mm)
Kind of rubber	NR CR

Sliding PTFE Elastomeric Bearings

The GJZF₄ series and GYZF₄ series sliding PTFE elastomeric bearings are made from ordinary Laminated elastomeric bearings of which surfaces are bonded PTFE plates equal to the bearings in dimensions. Except properties of the ordinary, their prominent characteristics are that low friction coefficients ($\mu f \leq 0.08$) between PTFE plates and stainless steel plates under beams are adoptable so that the horizontal upper structures shall not be limited.

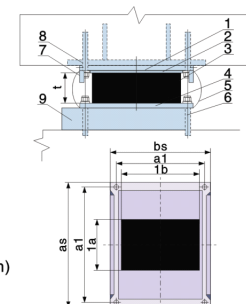
Load classification:150kN~7000kN



Assembly illu, of GJZF₄ and GYZ F₄ series elastomeric bearings

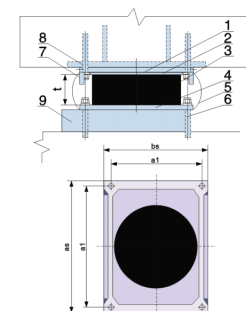
Assembly illu, of GJZF₄ series

- Where: 1.Upper steel plate 2.Stainless steel plate
 3.GJZF₄ rectangular bearing 4.down steel plate
 5.dust-proofed sleere 6.bolt
 7.Guide plate 8.Pre-embedded steel plate under beam
 9.Bearings pad stone
 t-Total nominal thickness of bearing (in mm)
 a1 and b1-Space between hloes for bolts for the upper and down steel plates (in mm)
 as and bs-dimensions of the upper and down steel plates (in mm)



Assembly illu, of GYZF₄ series multiway

- Where: 1.Upper steel plate 2.Stainless steel plate
 3.GYZF₄ rectangular bearing 4.down steel plate
 5.dust-proofed sleere 6.bolt
 7.Guide plate 8.Pre-embedded steel plate under beam
 9.Bearings pad stone
 t-Total nominal thickness of bearing (in mm)
 a1 = b1-Space between hloes for bolts for the upper and down steel plates (in mm)
 as = bs-dimensions of the upper and down steel plates (in mm)



Grade of Laminated Elastomeric Bearing Capacity

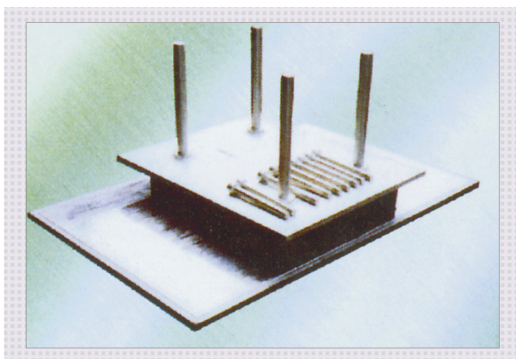
150-7000KN ,The client may request the production of some special types through consultation with factory.

Specifications of GJZ and GJZF₄ Rectangular Bearings

Plane sizes La × Lb (mm)	Bearing Capacity (KN)		GJZ(JBZ)Series		GJZF ₄ (JBZF ₄)Series		
	AASHTO	JT	Overall thickness (δ) (mm)	Allowed horizontal displacement Max. (braking force excluded)	Overall thickness (δ) (mm)	Bearing displacement(mm)	
						Longitudinal	Transverse
100 × 150	150	101	21,28	5.0,7.5	23,30	±30	±20
100 × 200	200	137	21,28	5.0,7.5	23,30	±30	±20
150 × 150	225	196	21,28,35,42	5.0,7.5,10.0,12.5	23,30,37,44	±30	±20
150 × 200	300	266	21,28,35,42	5.0,7.5,10.0,12.5	23,30,37,44	±30	±20
150 × 250	375	336	28,35,42	7.5,10.0,12.5	30,37,44	±30	±20
150 × 300	450	406	28,35,42	7.5,10.0,12.5	30,37,44	±30	±20
200 × 200	400	361	35,42,49,56	10.0,12.5,15.0,17.5	37,44,51,58	±30	±20
200 × 250	500	456	42,49,56	12.5,15.0,17.5	44,51,58	±30	±20
200 × 300	600	551	30,41,52	8.0,12.0,16.0	32,43,54	±30	±20
200 × 350	700	646	30,41,52	8.0,12.0,16.0	32,43,54	±30	±20
200 × 400	800	741	30,41,52	8.0,12.0,16.0	32,43,54	±30	±20
250 × 250	625	576	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
250 × 300	750	696	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
250 × 350	875	816	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
250 × 400	1000	936	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
250 × 450	1125	1056	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
250 × 500	1250	1176	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±50	±20
300 × 300	900	841	52,63,74,85	16.0,20.0,24.0,28.0	54,65,76,87	±70	±30
300 × 350	1050	986	52,63,74,85	16.0,20.0,24.0,28.0	54,65,76,87	±70	±30
300 × 400	1200	1131	52,63,74,85	16.0,20.0,24.0,28.0	54,65,76,87	±70	±30
300 × 450	1350	1276	63,74,85	20.0,24.0,28.0	65,76,87	±70	±30
300 × 500	1500	1421	54,69,84	16.5,22.0,27.5	56,71,86	±70	±30
300 × 550	1650	1566	54,69,84	16.5,22.0,27.5	57,72,87	±70	±30
300 × 600	1800	1711	54,69,84	16.5,22.0,27.5	57,72,87	±70	±30
350 × 350	1225	1156	63,74,85,96	20.0,24.0,28.0,32.0	65,76,87,98	±90	±40
350 × 400	1400	1326	54,69,84,99	16.5,22.0,27.5,33.0	56,71,86,101	±90	±40
350 × 450	1575	1496	54,69,84,99	16.5,22.0,27.5,33.0	56,71,86,101	±90	±40
350 × 500	1750	1666	54,69,84,99	16.5,22.0,27.5,33.0	56,71,86,101	±90	±40
350 × 550	1925	1836	54,69,84,99	16.5,22.0,27.5,33.0	57,72,87,102	±90	±40
350 × 600	2100	2006	54,69,84,99	16.5,22.0,27.5,33.0	57,72,87,102	±90	±40

Plane sizes La × Lb (mm)	Bearing Capacity (KN)		GJZ(JBZ)Series		GJZF ₄ (JBZF ₄)Series		
	AASHTO	JT	Overall thickness (δ) (mm)	Allowed horizontal displacement Max. (braking force excluded)	Overall thickness (δ) (mm)	Bearing displacement(mm)	
						Longitudinal	Transverse
400 × 400	1600	1521	54,69,84,99	16.5,22.0,27.5,33.0	56,71,86,101	±90	±40
400 × 450	1800	1716	69,84,99,114	22.0,27.5,33.0,38.5	71,86,101,116	±90	±40
400 × 500	2000	1911	69,84,99,114	22.0,27.5,33.0,38.5	71,86,101,116	±90	±40
400 × 550	2200	2106	69,84,99	22.0,27.5,33.0	72,87,102	±90	±40
400 × 600	2400	2301	69,84,99	22.0,27.5,33.0	72,87,102	±90	±40
400 × 650	2600	2496	69,84,99	22.0,27.5,33.0	72,87,102	±90	±40
450 × 450	2025	1936	69,84,99,114	22.0,27.5,33.0,38.5	71,86,101,116	±110	±40
450 × 500	2250	2156	84,99,114	27.5,33.0,38.5	86,101,116	±110	±40
450 × 550	2475	2376	84,99,114	27.5,33.0,38.5	87,102,117	±110	±40
450 × 600	2700	2596	70,90,110	22.5,30.0,37.5	73,93,113	±110	±40
450 × 650	2925	2816	70,90,110	22.5,30.0,37.5	73,93,113	±110	±40
500 × 500	2500	2401	70,90,110,130	22.5,30.0,37.5,45.0	72,92,112,132	±130	±40
500 × 550	2750	2646	70,90,110,130	22.5,30.0,37.5,45.0	73,93,113,133	±130	±40
500 × 600	3000	2891	70,90,110,130	22.5,30.0,37.5,45.0	73,93,113,133	±130	±40
500 × 650	3250	3136	70,90,110,130	22.5,30.0,37.5,45.0	73,93,113,133	±130	±40
500 × 700	3500	3381	70,90,110,130	22.5,30.0,37.5,45.0	73,93,113,133	±130	±40
550 × 550	3025	2916	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
550 × 600	3300	3186	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
550 × 650	3575	3456	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
600 × 600	3600	3481	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
600 × 650	3900	3776	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
600 × 700	4200	4071	110,130,150	37.5,45.0,52.5	113,133,153	±150	±40
600 × 750	4500	4366	110,130,150	37.5,45.0,52.5	113,133,153	±150	±40
650 × 650	4225	4096	110,130,150,170	37.5,45.0,52.5,60.0	113,133,153,173	±150	±40
650 × 700	4550	4416	102,125,148,171	36.0,45.0,54.0,63.0	105,128,151,174	±150	±40
650 × 750	4875	4736	102,125,148,171	36.0,45.0,54.0,63.0	105,128,151,174	±150	±40
700 × 700	4900	4761	102,125,148,171	36.0,45.0,54.0,63.0	105,128,151,174	±150	±40

Note: GJZF₄ (JBZF₄) Series certificate of division of family property one-way and multi-direction freely movable bearing, in table support's displacement quantity is more for multi-direction freely movable bearing's displacement quantity; The unidirectional freely movable bearing's longitudinal displacement quantity is the same with multi-direction support's, the unidirectional freely movable bearing's transverse displacement is ±3mm.



The New Duong Bridge (Vietnam) adopt the sliding bearing produced by our company.

Specifications of GYZ and GYZF₄ Circular Laminated Elastomeric Bearings

Bearing diameter d (mm)	Bearing Capacity (kN)		GYZ(YBZ)Series		GYZF ₄ (YBZF ₄)Series		
	AASHTO	JT	Overall thickness (δ) (mm)	Allowed horizontal displacement Max. (braking force excluded)	Overall thickness (δ) (mm)	Bearing displacement(mm)	
150	176	154	21,28,35,42	5.0,7.5,10.0,12.5	23,30,37,44	±30	±20
200	314	284	35,42,49,56	10.0,12.5,15.0,17.5	37,44,51,58	±30	±20
250	490	452	41,52,63,74	12.0,16.0,20.0,24.0	43,54,65,76	±60	±30
300	706	661	52,63,74,85	16.0,20.0,24.0,28.0	54,65,76,87	±60	±30
350	962	908	63,74,85,96	20.0,24.0,28.0,32.0	65,76,87,98	±90	±40
400	1257	1195	54,69,84,99	16.5,22.0,27.5,33.0	56,71,86,101	±90	±40
450	1590	1521	69,84,99,114	22.0,27.5,33.0,38.5	71,86,101,116	±110	±40
500	1963	1886	70,90,110,130	22.5,30.0,37.5,45.0	72,92,112,132	±110	±40
550	2370	2290	90,110,130,150	30,37.5,45.0,52.5	93,113,133,153	±130	±40
600	2827	2734	90,110,130,150	30.0,37.5,45.0,52.5	93,113,133,153	±130	±40
650	3318	3217	110,130,150,170	37.5,45.0,52.5,60.0	113,133,153,173	±150	±40
700	3848	3739	102,125,148,171	36.0,45.0,54.0,63.0	105,128,151,174	±150	±40
750	4418	4301	125,148,171,194	45.0,54.0,63.0,72.0	128,151,174,197	±180	±40
800	5027	4902	125,148,171,194	45.0,54.0,63.0,72.0	128,151,174,197	±180	±40

Note: GYZF₄ (YBZF₄) Series certificate of division of family property one-way and multi-direction freely movable bearing, in table support's displacement quantity is more for multi-direction freely movable bearing's displacement quantity; The unidirectional freely movable bearing's longitudinal displacement quantity is the same with multi-direction support's, the unidirectional freely movable bearing's transverse displacement is ±3mm

GPZ(II)Pot Bearings

Properties and Characteristics

GPZ(II) pot bearings are designed as per standard JT391-1999, which are replacement of the previous GPZ pot bearings of standard JT3141-90. GPZ(II) pot bearings are a new kinds of bridge bearings made up of the steel components and rubbers. It features with high loading capacity, great horizontal displacement, smooth rotation, etc. Compared with other types of pot bearings and cast steel roller bearings, it is lighter in weight, more compact and simple in structure, lower in construction height and easier for manufacture. Besides, it is much cheaper as less steel is used. This bearing is desirable for large span bridges. The loading capacity of this series of bearings is now of 31 grades, from 0.8MN-60MN, which can generally meet the demand of domestic construction of large bridges, with a service life of more than 50 years.

Physical Property Parameters of Rubber for the Pot Bearing (According with Standard JT)

Items		Polychloroprene rubber	Natural rubber
Hardness (IRHD)		60 ± 3	60 ± 3
Tensile strength (MPa)		≥ 17.0	≥ 18.0
Elongation at break (%)		≥ 400	≥ 450
Brittle temperature (°C)		≤ -40	≤ -55
Permanent deformation at constant compression 70°C × 22h (%)		≤ 20	≤ 25
Ozone resistance ageing, 20% of elongation, 40 °C × 96h		25 ~ 50PPhm	25 ~ 50PPhm
		No cracks	No cracks
Hot air-oven ageing test	Testing conditions (°C × h)	100°C × 70h	70°C × 168h
	Reduction of tensile strength (%)	< 15	< 15
	Reduction of elongation at break (%)	< 40	< 20
	Hardness changeable range (IRHD)	< +15	± 10

**Physical Property Parameters of Rubber for the Pot Bearing
(According with Standard AASHTO)**

Items		Polychloroprene rubber			Natural rubber		
Hardness (IRHD) ASTM D2240		50 ± 5	60 ± 5	70 ± 5	50 ± 5	60 ± 5	70 ± 5
Tensile strength (MPa) ASTM D412		≥ 15.5			≥ 15.5		
Elongation at break (%) ASTM D412		≥ 400	≥ 350	≥ 300	≥ 450	≥ 400	≥ 300
Low temperature brittleness (°C) ASTM D746		≤ -40			≤ -40		
Permanent deformation at constant compression (%) ASTM D395		100°C × 22 h			70°C × 22 h		
		≤ 35			≤ 25		
Ozone resistance ageing 100pphm, 20% of elongation ASTM D1149		37.8°C × 100 h			37.8°C × 48 h		
		100pphm			25pphm		
		No cracks			No cracks		
Hot air–oven ageing test ASTM D573	Testing conditions (°C×h)	100°C × 70 h			70°C × 70 h		
	Reduction of tensile strength, Maximum (%)	≥ -15			≥ -25		
	Reduction of elongation at break, Maximum (%)	≥ -40			≥ -25		
	Hardness changeable range, Maximum Points (IRHD)	≤ 15			≤ 10		

Grade of Bearing Capacity

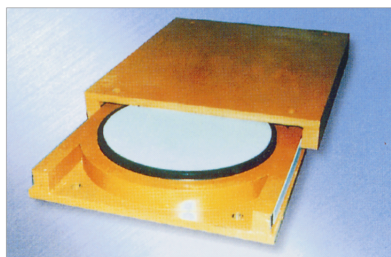
The client may request the production of some special types through consultation with the factory.

Range of Temperature Adaptable

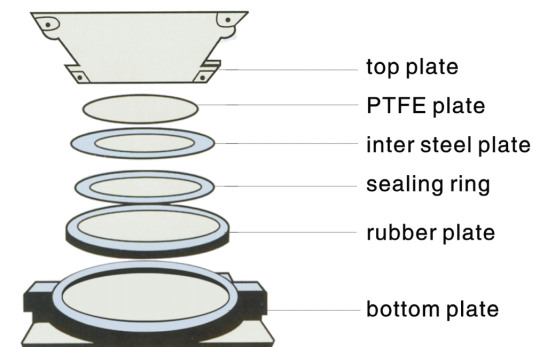
Normal temperature: -25°C~+60°C Cold resistant: -40°C~+60°C

Specification of Series GPZ(II)Pot Bearings

Refer to 3 in the standard JT391–1999, and Tables 1, 2 and 3.



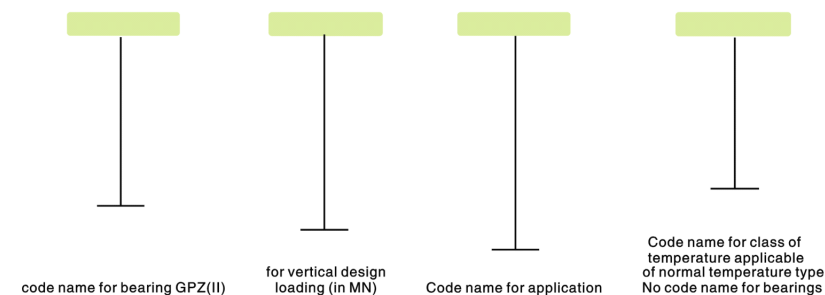
GPZ(II)Pot Rubber Bearing



Structure of GPZ(II)Pot Rubber Bearing

Denotation for Series GPZ(II)Pot Bearings

3.2 in standard JT391–1999



- E.g. 1. “GPZ(II)5SXF” denotes the highway bridge Pot bearing ,with the vertical design loading of 5MN,two–way movable and cold resistant.
2. “GPZ(II)1.5DX” denotes the highway bridge Pot bearing , with the vertical design loading of 1.5 MN, one way movable and for normal temperature.
3. “GPZ(II)8GD” denotes the fixed highway bridge Pot bearing ,with the vertical design loading of 8MN(GD denotes the vertical rotation only).
- 4.The pot bearing with special performance can be designed seperately.

Installation of Pot Bearings GPZ(II)

7.1 Preparations for Installation

7.1.1 It is recommended that a pad stone be placed under the pot bearing. With holes preset in accordance with the space between the anchor bolts, and the specification of the sleeve nut. The pad stone shall have a surface flat and smooth. The level at the top of the pad stone shall include the thickness of the epoxy mortar under the preset bearing base plate. The pad stone outside the base plate shall be made into a graded surface for fear of dead water.

7.1.2 The packing shall not be opened until installation of the bearing, and it shall be checked up for each part against the packing list. Prior to installation, the bearing shall not be dismantled without relevant approval.

7.2 Procedure and Instructions for Installation

7.2.1 Mark the centerline at the design position of the bearing, and also at its top and bottom plates.

7.2.2 Put the anchor bolt through the hole in the bottom or top plate and turn it into the sleeve nut. Between the bottom plate and the sleeve nut, place the rubber gasket whose diameter is slightly larger than that of the sleeve nut.

7.2.3 Once the bearing is in place, centered and leveled, fill up the anchor bolt hole and the padding layer of the bottom plate with epoxy mortar or high grade cement mortar. After the mortar is set hard, remove the pad used for adjusting the level of the bearing, and fill up the space left by the removed pad. Epoxy grouting shall be compact and solid.

7.2.4 If the bearing is welded to the structure, steel plates shall be embedded in advance at the top and bottom plates of the bearing. Once in place, the bearing shall be welded intermittently. Care shall be taken during welding to protect the rubber and PTFE plates against any possible damage caused by overheating. The welded part shall be treated against rust.

7.2.5 If the pot bearing is used on the T-beam, temporary support shall be provided at the end of the beam during installation to prevent it from leaning, which shall not be removed until the diaphragm between two T-beams is welded into a whole structure.

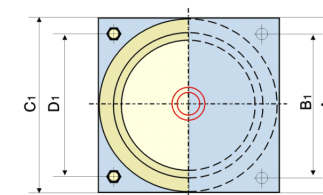
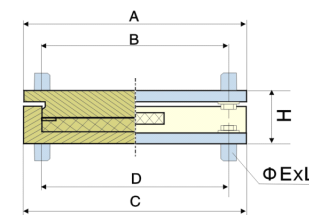
7.2.6 Once the sliding bearing is unpacked, measures shall be taken to protect the PTFE and stainless steel plates against any scratching or dirt sticking to their surface, and it shall be checked up whether 5201-2 silicone grease is filled up.

7.2.7 The centerline of the bearing shall overlap or be parallel to that of the main beam. During installation of the sliding guided bearing, the upper and lower guide blocks shall keep in parallel, and the crossing angle shall not be greater than 5°.

7.2.8 When the temporary anchor device is cut for shifting the system of a continuous beam bridge, measures shall be taken to keep the heat from damaging the rubber and PTFE plates.

Table 1 Dimension of Fixed Bearing

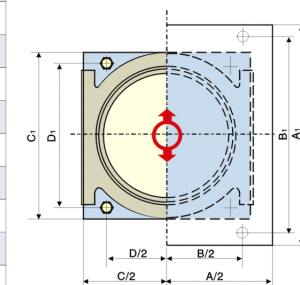
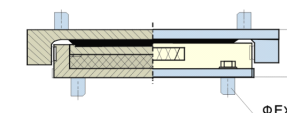
Type	Weight (kg)	Capacity (MN)	Structure size (Install size)mm					Sleeve nut $\Phi E \times L$
			A, A ₁	B, B ₁	C, C ₁	D, D ₁	H	
GPZ(II)0.8GD	27	0.8	250	210	250	210	70	$\Phi 20 \times 100$
GPZ(II)1GD	34	1	280	235	280	235	71	$\Phi 20 \times 100$
GPZ(II)1.25GD	40	1.25	305	255	305	255	73	$\Phi 20 \times 100$
GPZ(II)1.5GD	56	1.5	335	280	335	280	74	$\Phi 35 \times 150$
GPZ(II)2GD	75	2	385	330	385	330	82	$\Phi 35 \times 150$
GPZ(II)2.5GD	106	2.5	430	370	430	370	92	$\Phi 35 \times 150$
GPZ(II)3GD	129	3	470	400	470	400	95	$\Phi 40 \times 150$
GPZ(II)3.5GD	151	3.5	505	420	505	420	99	$\Phi 40 \times 150$
GPZ(II)4GD	196	4	540	460	540	460	111	$\Phi 40 \times 150$
GPZ(II)5GD	268	5	605	510	605	510	120	$\Phi 50 \times 200$
GPZ(II)6GD	353	6	660	560	660	560	133	$\Phi 50 \times 200$
GPZ(II)7GD	426	7	720	610	720	610	138	$\Phi 50 \times 200$
GPZ(II)8GD	561	8	770	660	770	660	154	$\Phi 60 \times 250$
GPZ(II)9GD	626	9	810	690	810	690	158	$\Phi 60 \times 250$
GPZ(II)10GD	718	10	860	740	860	740	164	$\Phi 60 \times 250$
GPZ(II)12.5GD	983	12.5	950	820	950	820	180	$\Phi 70 \times 300$
GPZ(II)15GD	1247	15	1050	900	1050	900	194	$\Phi 70 \times 300$
GPZ(II)17.5GD	1490	17.5	1130	960	1130	960	199	$\Phi 80 \times 350$
GPZ(II)20GD	1699	20	1205	1020	1205	1020	204	$\Phi 80 \times 350$
GPZ(II)22.5GD	2210	22.5	1290	1100	1290	1100	228	$\Phi 90 \times 400$
GPZ(II)25GD	2455	25	1360	1160	1360	1160	232	$\Phi 90 \times 400$
GPZ(II)27.5GD	2690	27.5	1420	1220	1420	1220	236	$\Phi 90 \times 400$
GPZ(II)30GD	2966	30	1480	1270	1480	1270	239	$\Phi 100 \times 400$
GPZ(II)32.5GD	3430	32.5	1535	1320	1535	1320	257	$\Phi 100 \times 400$
GPZ(II)35GD	3783	35	1595	1370	1595	1370	266	$\Phi 100 \times 400$
GPZ(II)37.5GD	4114	37.5	1660	1440	1660	1440	269	$\Phi 100 \times 400$
GPZ(II)40GD	4446	40	1710	1480	1710	1480	272	$\Phi 110 \times 450$
GPZ(II)45GD	5344	45	1810	1560	1810	1560	293	$\Phi 110 \times 450$
GPZ(II)50GD	5995	50	1900	1640	1900	1640	302	$\Phi 110 \times 450$
GPZ(II)55GD	7152	55	2000	1720	2000	1720	323	$\Phi 120 \times 450$
GPZ(II)60GD	7772	60	2080	1790	2080	1790	327	$\Phi 120 \times 450$



Series GPZ (II) Fixed pot bearings (Model GD)

Table 2 Dimension of One-way Movement Bearing

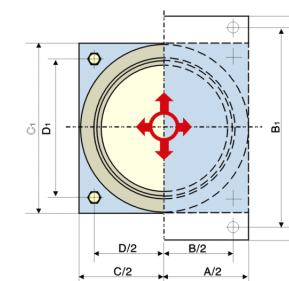
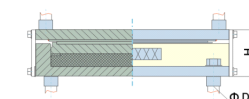
Type	Capacity (MN)	Structure size(Install size)(mm)													Weight (kg)		Sleeve nut ΦE×L	Longitudinal displacement (mm)			Transverse displacement (mm)	
		A	B	C	D	C1	D1	A1			B1			H								
GPZ(Ⅱ)0.8DX	0.8	310	220	250	210	250	210	330	430	530	290	390	490	70	36	41	47	Φ20×100	±50	±100	±150	±3
GPZ(Ⅱ)1DX	1	340	250	280	235	280	235	360	460	560	320	420	520	71	44	50	55	Φ20×100	±50	±100	±150	±3
GPZ(Ⅱ)1.25DX	1.25	365	270	305	255	305	255	380	480	580	340	440	540	73	51	57	63	Φ20×100	±50	±100	±150	±3
GPZ(Ⅱ)1.5DX	1.5	400	300	335	280	335	280	400	500	600	360	460	560	74	67	74	81	Φ35×150	±50	±100	±150	±3
GPZ(Ⅱ)2DX	2	455	330	385	330	385	330	440	540	640	400	500	600	82	91	99	107	Φ35×150	±50	±100	±150	±3
GPZ(Ⅱ)2.5DX	2.5	510	380	430	370	430	370	480	580	680	430	530	630	92	127	139	150	Φ35×150	±50	±100	±150	±3
GPZ(Ⅱ)3DX	3	560	420	470	400	470	400	520	620	720	460	560	660	95	157	170	182	Φ40×150	±50	±100	±150	±3
GPZ(Ⅱ)3.5DX	3.5	595	460	505	420	505	420	540	640	740	480	580	680	99	194	208	221	Φ40×150	±100	±150	±200	±3
GPZ(Ⅱ)4DX	4	630	480	540	460	540	460	570	670	770	500	600	700	111	247	263	280	Φ40×150	±100	±150	±200	±3
GPZ(Ⅱ)5DX	5	705	550	605	510	605	510	630	730	830	530	630	730	120	333	352	371	Φ50×200	±100	±150	±200	±3
GPZ(Ⅱ)6DX	6	760	610	660	560	660	560	690	790	890	580	680	780	133	427	450	473	Φ50×200	±100	±150	±200	±3
GPZ(Ⅱ)7DX	7	825	640	720	610	720	610	750	850	950	610	710	810	138	511	536	562	Φ50×200	±100	±150	±200	±3
GPZ(Ⅱ)8DX	8	880	680	770	660	770	660	800	900	1000	640	740	840	154	664	695	726	Φ60×250	±100	±150	±200	±3
GPZ(Ⅱ)9DX	9	920	720	810	690	810	690	840	940	1040	680	780	880	158	733	765	797	Φ60×250	±100	±150	±200	±3
GPZ(Ⅱ)10DX	10	970	760	860	740	860	740	890	990	1090	720	820	920	164	869	903	937	Φ60×250	±150	±200	±250	±3
GPZ(Ⅱ)12.5DX	12.5	1080	840	950	820	950	820	1000	1100	1200	800	900	1000	180	1183	1226	1269	Φ70×300	±150	±200	±250	±3
GPZ(Ⅱ)15DX	15	1190	940	1050	900	1050	900	1080	1180	1280	840	940	1040	194	1481	1530	1578	Φ70×300	±150	±200	±250	±3
GPZ(Ⅱ)17.5DX	17.5	1280	1010	1130	960	1130	960	1160	1260	1360	880	980	1080	199	1753	1805	1857	Φ80×350	±150	±200	±250	±3
GPZ(Ⅱ)20DX	20	1355	1090	1205	1020	1205	1020	1240	1340	1440	920	1020	1120	204	1978	2033	2087	Φ80×350	±150	±200	±250	±3
GPZ(Ⅱ)22.5DX	22.5	1450	1180	1290	1100	1290	1100	1320	1420	1520	960	1060	1160	228	2567	2632	2698	Φ90×400	±150	±200	±250	±3
GPZ(Ⅱ)25DX	25	1530	1260	1360	1160	1360	1160	1380	1480	1580	1000	1100	1200	232	2838	2908	2985	Φ90×400	±150	±200	±250	±3
GPZ(Ⅱ)27.5DX	27.5	1590	1300	1420	1220	1420	1220	1440	1540	1640	1040	1140	1240	236	3090	3162	3241	Φ90×400	±150	±200	±250	±3
GPZ(Ⅱ)30DX	30	1660	1370	1480	1270	1480	1270	1500	1600	1700	1080	1180	1280	239	3385	3466	3542	Φ100×400	±150	±200	±250	±3
GPZ(Ⅱ)32.5DX	32.5	1725	1430	1535	1320	1535	1320	1560	1660	1760	1120	1220	1320	257	4017	4103	4190	Φ100×400	±200	±250	±300	±3
GPZ(Ⅱ)35DX	35	1795	1480	1595	1370	1595	1370	1600	1700	1800	1160	1260	1360	266	4416	4507	4597	Φ100×400	±200	±250	±300	±3
GPZ(Ⅱ)37.5DX	37.5	1870	1540	1660	1440	1660	1440	1680	1780	1880	1200	1300	1400	269	4805	4900	4995	Φ100×400	±200	±250	±300	±3
GPZ(Ⅱ)40DX	40	1920	1600	1710	1480	1710	1480	1720	1820	1920	1240	1340	1440	272	5152	5249	5346	Φ110×450	±200	±250	±300	±3
GPZ(Ⅱ)45DX	45	2040	1700	1810	1560	1810	1560	1800	1900	2000	1280	1380	1480	293	6197	6310	6423	Φ110×450	±200	±250	±300	±3
GPZ(Ⅱ)50DX	50	2130	1790	1900	1640	1900	1640	1920	2020	2120	1320	1420	1520	302	6885	7002	7120	Φ110×450	±200	±250	±300	±3
GPZ(Ⅱ)55DX	55	2240	1870	2000	1720	2000	1720	2040	2140	2240	1360	1460	1560	323	8199	8333	8468	Φ120×450	±200	±250	±300	±3
GPZ(Ⅱ)60DX	60	2330	1950	2080	1790	2080	1790	2120	2220	2320	1400	1500	1600	327	8884	9023	9163	Φ120×450	±200	±250	±300	±3



GPZ(Ⅱ) series of one-way movement bearing (Model DX)

Table 3 Dimension of Two-way Movement Bearing

Type	Capacity (MN)	Structure size(Install size)(mm)														Weight (kg)		Sleeve nut ΦE×L	Longitudinal displacement (mm)			Transverse displacement (mm)
		A	B	C	D	C1	D1	A1		B1		H										
GPZ(Ⅱ)0.8SX	0.8	300	260	300	230	250	210	350	450	550	310	410	510	70	32	36	39	Φ12×100	±50	±100	±150	±3
GPZ(Ⅱ)1SX	1	320	280	320	250	280	230	380	480	580	340	440	540	71	38	42	46	Φ12×100	±50	±100	±150	±3
GPZ(Ⅱ)1.25SX	1.25	340	300	340	270	305	255	400	500	600	360	460	560	73	44	49	53	Φ12×100	±50	±100	±150	±3
GPZ(Ⅱ)1.5SX	1.5	360	320	360	290	330	270	420	520	620	380	480	580	74	51	56	61	Φ14×150	±50	±100	±150	±3
GPZ(Ⅱ)2SX	2	400	360	400	330	375	310	440	540	640	400	500	600	82	68	73	78	Φ14×150	±50	±100	±150	±3
GPZ(Ⅱ)2.5SX	2.5	440	390	440	370	415	350	480	580	680	430	530	630	92	97	104	112	Φ18×150	±50	±100	±150	±3
GPZ(Ⅱ)3SX	3	480	420	480	400	455	380	520	620	720	460	560	660	95	117	125	133	Φ18×150	±50	±100	±150	±3
GPZ(Ⅱ)3.5SX	3.5	490	430	490	400	490	400	640	740	940	580	680	780	99	141	150	158	Φ18×150	±100	±150	±200	±3
GPZ(Ⅱ)4SX	4	525	465	525	430	525	430	670	770	970	610	710	810	111	189	200	210	Φ25×150	±100	±150	±200	±3
GPZ(Ⅱ)5SX	5	585	515	585	480	585	480	730	830	930	660	760	860	120	244	256	269	Φ25×200	±100	±150	±200	±3
GPZ(Ⅱ)6SX	6	640	570	640	520	640	520	770	870	970	700	800	900	133	326	342	358	Φ25×200	±100	±150	±200	±3
GPZ(Ⅱ)7SX	7	690	620	690	570	690	570	820	920	1020	750	850	950	138	391	408	425	Φ35×200	±100	±150	±200	±3
GPZ(Ⅱ)8SX	8	740	660	740	610	740	610	870	970	1070	790	890	990	154	506	527	548	Φ35×250	±100	±150	±200	±3
GPZ(Ⅱ)9SX	9	780	695	780	650	780	650	900	1000	1100	815	915	1015	158	567	589	611	Φ35×250	±100	±150	±200	±3
GPZ(Ⅱ)10SX	10	825	735	825	690	825	690	1040	1140	1240	950	1050	1150	164	669	692	716	Φ35×250	±150	±200	±250	±3
GPZ(Ⅱ)12.5SX	12.5	920	815	920	770	920	770	1120	1220	1320	1015	1115	1215	180	922	952	982	Φ45×300	±150	±200	±250	±3
GPZ(Ⅱ)15SX	15	1010	905	1010	850	1010	950	1200	1300	1400	1095	1195	1295	194	1153	1185	1218	Φ45×300	±150	±200	±250	±3
GPZ(Ⅱ)17.5SX	17.5	1090	970	1090	920	1090	920	1270	1370	1470	1150	1250	1350	199	1351	1386	1421	Φ45×350	±150	±200	±250	±3
GPZ(Ⅱ)20SX	20	1170	1050	1170	1000	1170	1000	1340	1440	1540	1220	1320	1420	204	1561	1599	1636	Φ45×350	±150	±200	±250	±3
GPZ(Ⅱ)22.5SX	22.5	1240	1105	1240	1050	1240	1050	1420	1520	1620	1285	1385	1485	228	1973	2018	2063	Φ45×400	±150	±200	±250	±3
GPZ(Ⅱ)25SX	25	1310	1175	1310	1120	1310	1120	1470	1570	1670	1335	1435	1535	232	2205	2252	2307	Φ50×400	±150	±200	±250	±3
GPZ(Ⅱ)27.5SX	27.5	1380	1245	1380	1190	1380	1190	1520	1620	1720	1385	1485	1585	236	2456	2506	2563	Φ50×400	±150	±200	±250	±3
GPZ(Ⅱ)30SX	30	1440	1290	1440	1230	1440	1230	1570	1670	1770	1420	1520	1620	239	2682	2742	2795	Φ50×400	±150	±200	±250	±3
GPZ(Ⅱ)32.5SX	32.5	1490	1340	1490	1280	1490	1280	1720	1820	1920	1570	1670	1770	257	3180	3240	3301	Φ50×400	±200	±250	±300	±3
GPZ(Ⅱ)35SX	35	1550	1400	1550	1340	1550	1340	1770	1870	1970	1620	1720	1820	266	3535	3598	3661	Φ60×400	±200	±250	±300	±3
GPZ(Ⅱ)37.5SX	37.5	1610	1460	1610	1400	1610	1400	1820	1920	2020	1670	1770	1870	269	3822	3887	3952	Φ60×400	±200	±250	±300	±3
GPZ(Ⅱ)40SX	40	1670	1505	1670	1440	1670	1440	1870	1970	2070	1705	1805	1905	272	4131	4199	4267	Φ60×450	±200	±250	±300	±3
GPZ(Ⅱ)45SX	45	1760	1595	1760	1520	1760	1520	1950	2050	2150	1785	1885	1985	293	4944	5022	5101	Φ60×450	±200	±250	±300	±3
GPZ(Ⅱ)50SX	50	1840	1675	1840	1600	1840	1600	2020	2120	2220	1855	1955	2055	302	5544	5626	5708	Φ75×450	±200	±250	±300	±3
GPZ(Ⅱ)55SX	55	1940	1760	1940	1690	1940	1690	2100	2200	2300	1920	2020	2120	323	6596	6690	6784	Φ75×450	±200	±250	±300	±3
GPZ(Ⅱ)60SX	60	2020	1840	2020	1750	2020	1750	2170	2270	2370	1990	2090	2190	327	7180	7278	7375	Φ75×450	±200	±250	±300	±3



GPZ(Ⅱ) series of two-way movement bearing (Model SX)

OVM-QPZ Pot Bearings

Abstract

The working mechanism of OVM-QPZ Pot Bearings takes advantage of the rubber pad sealed inside of the steel pot, which has the fluidal incompressible characteristics under three-dimensional pressure condition, to transfer load reliably from super-structure to piers or abutments. If bridge, and enable the bridge girder-ends to have rotating. A PTFE plate is affiliated on top. If the lining steel plate enable the superstructure horizontally movable, it tremendously reduces the shear stress caused and enforced to the bearing by promoting possible relative slipping movement between PTFE plate and stainless steel plate. Thus, these functions can assure bridges' safe service. Summarily, the Pot Bearing can fulfill the requirement of structure with big bearing force, big horizontal displacement and big rotation behavior.

Technical Parameters

1. OVM-QPZ series Pot Bearing is classified into 31 grade according to its capacity ranging between 0.8 ~ 60MN. The capacity and service scope are improved on basis of the former QPZ series. Under design load, the compression deformation is less than 2% of total height; the pot edge diameter deformation is less than 0.5% of the outer diameter.
2. This series comprises of fixed bearing, DX one-way movable bearing, SX two-way movable bearing. The displacement capacity is improved compared to the former QPZ series.
3. The horizontal force capacity to fixed bearings and to the non-movable side of one-way movable bearings is less than 10% of vertical capacity.
4. Rotation angle is less than 0.02 rad, which is bigger than that of QPZ's 0.012 rad.
5. When use code 5201 silicone grease for lubrication, the designing friction factor under normal temperature is 0.03, and it is designed as 0.06 under cold weather condition.
6. It uses sealers, which feature better wear resistance and sealing property than that of low-alloy steel hoops.
7. The foundation bolts are matched with tubes, which feature easy installation and maintenance.
8. OVM-QPZ series pot bearing have been optimized their apparent configuration and become compactable.

Comparison to GPZ(II) Series Pot Bearings

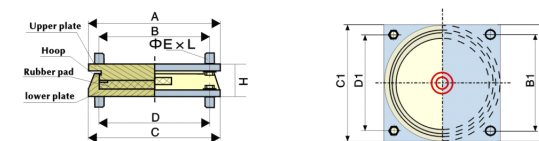
OVM-QPZ series pot bearings are designed according to the Standard or Specification such as JT391-1999, Pot Rubber Bearings for Highway Bridges, issued by China Communication Standard, JTJ023-85, Designing Specification for Highway RC&PC Bridges and Tunnels, also be considered to fulfill the European Standard Draft PREN1337-5, Pot Rubber Bearing, 1996, and Chapter 14, Expansion Joint and Bearings in American Designing Specification for Highway Bridge. By comparing to GPZ(II) Pot Bearings, the technical properties of OVM-QPZ series Pot Bearing remain unchanged. But for the one-way movable bearings, the mid-guide solution is adopted, which is preferred in Europe and America. This solution has many advantages compared to the bilateral guide solution of GPZ(II) one-way Pot Bearings.

1. By applying the mid-guide solution, the steel lining plate will be caused to slightly rotation upon to girder lateral buckling which counterbalance the transversal force, while the bilateral guide bearing has to withstand the transversal force for cause.
2. During the fabrication of bilateral guide bearings, the upper and lower guide blocks should be assured to be parallel to each other and the crosshatch angle should be less than 5', otherwise it might jam and obstruct the girder movement. However, for mid-guide bearings, this would not happen.
3. It also features economic and easy installation advantages.

Dimension and Weight of Bearing (Details in Tables 1, 2 and 3)

Table 1 Dimension and Weight of Fixed Bearing (GD)

Type	Capacity (MN)	Structure size (Install size) mm					Weight (kg)
		A, A1	B, B1	C, C1	D, D1	H	
OVM-QPZ0.8GD	0.8	260	220	260	220	75	42
OVM-QPZ1GD	1	290	250	290	250	80	51
OVM-QPZ1.25GD	1.25	315	270	315	270	82	58
OVM-QPZ1.5GD	1.5	340	290	340	290	90	72
OVM-QPZ2GD	2	390	330	390	330	95	90
OVM-QPZ2.5GD	2.5	440	370	440	370	105	126
OVM-QPZ3GD	3	480	400	480	400	110	157
OVM-QPZ3.5GD	3.5	510	420	510	420	120	187
OVM-QPZ4GD	4	550	460	550	460	130	238
OVM-QPZ5GD	5	610	510	610	510	140	318
OVM-QPZ6GD	6	670	560	670	560	150	399
OVM-QPZ7GD	7	730	610	730	610	165	508
OVM-QPZ8GD	8	780	660	780	660	175	638
OVM-QPZ9GD	9	820	690	820	690	180	706
OVM-QPZ10GD	10	880	740	880	740	190	835
OVM-QPZ12.5GD	12.5	970	820	970	820	205	1107
OVM-QPZ15GD	15	1070	900	1070	900	220	1413
OVM-QPZ17.5GD	17.5	1150	960	1150	960	230	1696
OVM-QPZ20GD	20	1220	1020	1220	1020	240	1945
OVM-QPZ22.5GD	22.5	1310	1100	1310	1100	260	2466
OVM-QPZ25GD	25	1380	1160	1380	1160	265	2742
OVM-QPZ27.5GD	27.5	1440	1220	1440	1220	275	3036
OVM-QPZ30GD	30	1500	1270	1500	1270	285	3397
OVM-QPZ32.5GD	32.5	1550	1320	1550	1320	295	3766
OVM-QPZ35GD	35	1610	1370	1610	1370	305	4177
OVM-QPZ37.5GD	37.5	1680	1440	1680	1440	310	4599
OVM-QPZ40GD	40	1730	1480	1730	1480	315	4966
OVM-QPZ45GD	45	1830	1560	1830	1560	335	5968
OVM-QPZ50GD	50	1920	1640	1920	1640	340	6593
OVM-QPZ55GD	55	2020	1720	2020	1720	350	7593
OVM-QPZ60GD	60	2100	1790	2100	1790	365	8495



OVM-QPZ Fixed Pot Bearing (Model GD)

Table 2 Dimension and Weight of One-way Bearing (GD)

Type	Capacity (MN)	Structure size(Install size) mm												Sleeve nut ΦE×L	Weight (kg)			Longitudinal displacement			Transverse displacement	
		A	B	C	D	C1	D1	A1			B1											H
OVM-QPZ0.8DX	0.8	260	220	260	220	260	220	350	450	550	290	390	490	100	Φ35×250	57	64	70	±50	±100	±150	±2
OVM-QPZ1DX	1	290	250	290	250	290	250	370	470	570	320	420	520	105	Φ35×250	68	75	82	±50	±100	±150	±2
OVM-QPZ1.25DX	1.25	315	270	315	270	315	270	395	495	595	340	440	540	107	Φ35×250	78	86	93	±50	±100	±150	±2
OVM-QPZ1.5DX	1.5	340	290	340	290	340	290	420	520	620	360	460	560	120	Φ35×250	99	108	118	±50	±100	±150	±2
OVM-QPZ2DX	2	390	330	390	330	390	330	460	560	660	400	500	600	125	Φ35×250	125	136	146	±50	±100	±150	±2
OVM-QPZ2.5DX	2.5	440	370	440	370	440	370	490	590	690	440	540	640	130	Φ35×250	159	171	183	±50	±100	±150	±2
OVM-QPZ3DX	3	480	400	480	400	480	400	530	630	730	480	580	680	135	Φ40×250	196	209	222	±50	±100	±150	±2
OVM-QPZ3.5DX	3.5	510	420	510	420	510	420	660	760	860	600	700	800	140	Φ40×250	235	249	263	±100	±150	±200	±2
OVM-QPZ4DX	4	550	460	550	460	550	460	685	785	885	630	730	830	150	Φ40×250	293	310	327	±100	±150	±200	±2
OVM-QPZ5DX	5	610	510	610	510	610	510	735	835	935	670	770	870	160	Φ50×300	382	401	420	±100	±150	±200	±2
OVM-QPZ6DX	6	670	560	670	560	670	560	780	880	980	710	810	910	170	Φ50×300	469	490	511	±100	±150	±200	±2
OVM-QPZ7DX	7	730	610	730	610	730	610	825	925	1025	760	860	960	185	Φ50×300	587	613	639	±100	±150	±200	±2
OVM-QPZ8DX	8	780	660	780	660	780	660	870	970	1070	800	900	1000	190	Φ60×300	702	729	757	±100	±150	±200	±2
OVM-QPZ9DX	9	820	690	820	690	820	690	910	1010	1110	830	930	1030	200	Φ60×300	805	837	869	±100	±150	±200	±2
OVM-QPZ10DX	10	880	740	880	740	880	740	1040	1140	1240	970	1070	1170	210	Φ60×300	971	1005	1040	±150	±200	±250	±2
OVM-QPZ12.5DX	12.5	970	820	970	820	970	820	1130	1230	1330	1040	1140	1240	230	Φ70×350	1308	1350	1392	±150	±200	±250	±2
OVM-QPZ15DX	15	1070	900	1070	900	1070	900	1200	1300	1400	1120	1220	1320	240	Φ70×350	1592	1638	1684	±150	±200	±250	±2
OVM-QPZ17.5DX	17.5	1150	960	1150	960	1150	960	1270	1370	1470	1180	1280	1380	255	Φ80×350	1949	2003	2057	±150	±200	±250	±2
OVM-QPZ20DX	20	1220	1020	1220	1020	1220	1020	1340	1440	1540	1250	1350	1450	265	Φ80×350	2227	2284	2342	±150	±200	±250	±2
OVM-QPZ22.5DX	22.5	1310	1100	1310	1100	1310	1100	1420	1520	1620	1320	1420	1520	270	Φ90×400	2639	2701	2762	±150	±200	±250	±2
OVM-QPZ25DX	25	1380	1160	1380	1160	1380	1160	1470	1570	1670	1370	1470	1570	275	Φ90×400	2916	2981	3046	±150	±200	±250	±2
OVM-QPZ27.5DX	27.5	1440	1220	1440	1220	1440	1220	1520	1620	1720	1420	1520	1620	290	Φ90×400	3301	3374	3448	±150	±200	±250	±2
OVM-QPZ30DX	30	1500	1270	1500	1270	1500	1270	1570	1670	1770	1450	1550	1650	300	Φ100×400	3674	3750	3827	±150	±200	±250	±2
OVM-QPZ32.5DX	32.5	1550	1320	1550	1320	1550	1320	1720	1820	1920	1600	1700	1800	315	Φ100×400	4261	4346	4431	±200	±250	±300	±2
OVM-QPZ35DX	35	1610	1370	1610	1370	1610	1370	1770	1870	1970	1650	1750	1850	320	Φ100×400	4594	4683	4771	±200	±250	±300	±2
OVM-QPZ37.5DX	37.5	1680	1440	1680	1440	1680	1440	1820	1920	2020	1700	1800	1900	330	Φ100×400	5089	5182	5274	±200	±250	±300	±2
OVM-QPZ40DX	40	1730	1480	1730	1480	1730	1480	1870	1970	2070	1730	1830	1930	335	Φ110×450	5481	5576	5671	±200	±250	±300	±2
OVM-QPZ45DX	45	1830	1560	1830	1560	1830	1560	1950	2050	2150	1810	1910	2010	355	Φ110×450	6525	6632	6740	±200	±250	±300	±2
OVM-QPZ50DX	50	1920	1640	1920	1640	1920	1640	2020	2120	2220	1880	1980	2080	365	Φ110×450	7254	7367	7480	±200	±250	±300	±2
OVM-QPZ55DX	55	2020	1720	2020	1720	2020	1720	2100	2200	2300	1950	2050	2150	380	Φ120×450	8460	8587	8714	±200	±250	±300	±2
OVM-QPZ60DX	60	2100	1790	2100	1790	2100	1790	2170	2270	2370	2020	2120	2220	390	Φ120×450	9243	9374	9506	±200	±250	±300	±2

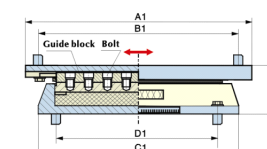
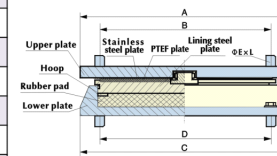
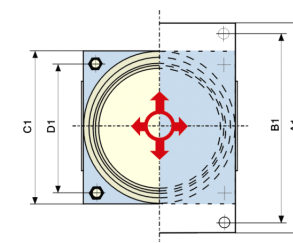
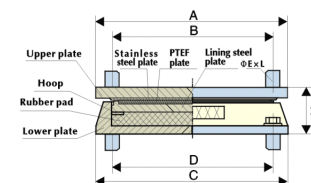
OVM-QPZ one-way movable Pot Bearing
(Model DX)

Table 3 Dimension and Weight of Two-way Bearing (SX)

Type	Capacity (MN)	Structure size(Install size) mm													Sleeve nut ΦE×L	Weight (kg)			Longitudinal displacement			Transverse displacement
		A	B	C	D	C1	D1	A1			B1			H								
OVM-QPZ0.8SX	0.8	300	260	300	240	260	220	350	450	550	310	410	510	75	Φ35×250	48	52	56	±50	±100	±150	±40
OVM-QPZ1SX	1	320	280	320	270	290	245	380	480	580	340	440	540	80	Φ35×250	56	60	64	±50	±100	±150	±40
OVM-QPZ1.25SX	1.25	340	300	340	290	315	270	400	500	600	360	460	560	82	Φ35×250	62	67	71	±50	±100	±150	±40
OVM-QPZ1.5SX	1.5	360	320	360	310	340	290	420	520	620	380	480	580	90	Φ35×250	75	79	84	±50	±100	±150	±40
OVM-QPZ2SX	2	400	360	400	340	380	320	440	540	640	400	500	600	95	Φ35×250	89	94	100	±50	±100	±150	±40
OVM-QPZ2.5SX	2.5	440	400	440	380	420	360	480	580	680	440	540	640	105	Φ35×250	120	128	135	±50	±100	±150	±40
OVM-QPZ3SX	3	480	430	480	400	460	390	520	620	720	470	570	670	110	Φ40×250	150	158	167	±50	±100	±150	±40
OVM-QPZ3.5SX	3.5	495	440	495	410	495	410	640	740	840	590	690	790	120	Φ40×250	188	199	209	±100	±150	±200	±40
OVM-QPZ4SX	4	535	480	535	440	535	440	670	770	870	620	720	820	130	Φ40×250	240	253	266	±100	±150	±200	±40
OVM-QPZ5SX	5	590	530	590	490	590	490	730	830	930	670	770	870	140	Φ50×300	315	330	345	±100	±150	±200	±40
OVM-QPZ6SX	6	645	580	645	530	645	530	770	870	970	710	810	910	150	Φ50×300	385	402	418	±100	±150	±200	±40
OVM-QPZ7SX	7	700	640	700	580	700	580	820	920	1020	760	860	960	165	Φ50×300	485	506	526	±100	±150	±200	±40
OVM-QPZ8SX	8	750	680	750	630	750	630	870	970	1070	800	900	1000	175	Φ60×300	613	637	662	±100	±150	±200	±40
OVM-QPZ9SX	9	790	720	790	660	790	660	900	1000	1100	830	930	1030	180	Φ60×300	676	702	728	±100	±150	±200	±40
OVM-QPZ10SX	10	840	770	840	710	840	710	1040	1140	1240	970	1070	1170	190	Φ60×300	807	835	862	±150	±200	±250	±40
OVM-QPZ12.5SX	12.5	930	850	930	790	930	790	1120	1220	1320	1040	1140	1240	205	Φ70×350	1065	1096	1126	±150	±200	±250	±40
OVM-QPZ15SX	15	1030	950	1030	870	1030	870	1200	1300	1400	1120	1220	1320	220	Φ70×350	1360	1398	1436	±150	±200	±250	±40
OVM-QPZ17.5SX	17.5	1100	1010	1100	930	1100	930	1270	1370	1470	1180	1280	1380	230	Φ80×350	1605	1645	1686	±150	±200	±250	±40
OVM-QPZ20SX	20	1180	1090	1180	1010	1180	1010	1340	1440	1540	1250	1350	1450	240	Φ80×350	1869	1912	1955	±150	±200	±250	±40
OVM-QPZ22.5SX	22.5	1260	1160	1260	1080	1260	1080	1420	1520	1620	1320	1420	1520	260	Φ90×400	2345	2396	2447	±150	±200	±250	±40
OVM-QPZ25SX	25	1330	1230	1330	1140	1330	1140	1470	1570	1670	1370	1470	1570	265	Φ90×400	2598	2652	2706	±150	±200	±250	±40
OVM-QPZ27.5SX	27.5	1400	1300	1400	1210	1400	1210	1520	1620	1720	1420	1520	1620	275	Φ90×400	2909	2966	3023	±150	±200	±250	±40
OVM-QPZ30SX	30	1460	1340	1460	1260	1460	1260	1570	1670	1770	1450	1550	1650	285	Φ100×400	3253	3312	3372	±150	±200	±250	±40
OVM-QPZ32.5SX	32.5	1510	1390	1510	1310	1510	1310	1720	1820	1920	1600	1700	1800	295	Φ100×400	3671	3733	3794	±200	±250	±300	±50
OVM-QPZ35SX	35	1570	1450	1570	1370	1570	1370	1770	1870	1970	1650	1750	1850	305	Φ100×400	4075	4145	4215	±200	±250	±300	±50
OVM-QPZ37.5SX	37.5	1630	1510	1630	1430	1630	1430	1820	1920	2020	1700	1800	1900	315	Φ100×400	4492	4564	4637	±200	±250	±300	±50
OVM-QPZ40SX	40	1690	1550	1690	1460	1690	1460	1870	1970	2070	1730	1830	1930	320	Φ110×450	4898	4973	5048	±200	±250	±300	±50
OVM-QPZ45SX	45	1790	1650	1790	1550	1790	1550	1950	2050	2150	1810	1910	2010	340	Φ110×450	5876	5963	6049	±200	±250	±300	±50
OVM-QPZ50SX	50	1870	1730	1870	1630	1870	1630	2020	2120	2220	1880	1980	2080	350	Φ110×450	6496	6587	6677	±200	±250	±300	±50
OVM-QPZ55SX	55	1970	1820	1970	1720	1970	1720	2100	2200	2300	1950	2050	2150	365	Φ120×450	7627	7730	7833	±200	±250	±300	±50
OVM-QPZ60SX	60	2050	1900	2050	1780	2050	1780	2170	2270	2370	2020	2120	2220	375	Φ120×450	8354	8461	8568	±200	±250	±300	±50

OVM-QPZ two-way movable Pot Bearing
(Model SX)

Installation Instructions

In order to assure operational quality ,and for the convenience to adjust ,observe and exchange bearings,it is necessary to setup foundation pad at the top of pier, whether the girders are fabricated by site-casting or pre-casted.

- 1.The size of the foundation pad should be enough to stand the load from the superstructure. Normally , the length and width are 200mm larger than that of lower plate of bearing. The height should be over 60mm to assure that there is enough space to be able to place jacks for the purpose of exchange bearings. The surrounding should be slopped to avoid water accumulation.
- 2.The foundation pad should be steel bar reinforced.The vertical bar should be well welded to the bars in piers.The concrete grade for the fabrication of the foundation pad is over C45. The pad surface should be fairly smooth and clean.

Installation Method:

1. For Girders Casting at Site

- A. Holes for plant tubes should be preset in foundation pads.The hole diameter should be 2-3 times bigger than the tube diameter, hole depth be longer than tube length.
- B. Mark the axial line of bearing according to design drawings.
- C.The upper plate and lower plate of bearing will subjected to horizontal calibration . For movable (flexible) bearings , a displacement will be preset as per design requirement and the site temperature . Then,welding 4 pieces of steel plate to the bearing to connect upper and lower plates. (Usually, this work has already pre-fabricated in a factory).
- D.The pot bearing should be moved integrally. Have bolt pass through holes on lower plate and upper plate of bearing and drive it into the tube . Rubber washers need to be lined between the tube and lower plate and upper plate . Correct the axial line and lay down bearing and have the bolts insert into the preset holes in foundation pad. Use 4 wedges to adjust the whole bearing to designing height . The lower plate should be 20~50mm above of the foundation pad . Four corners' height difference should be controlled with 1mm under the load of 5MN less, or within 2mm under load of 5MN more.
- E.Epoxy grout or non-shrinking grout are used to insert into the tubes and beneath the lower plate . After the grout has hardened , remove the four wedges and refill the clearance with grouting . The grout should be compact and solid.
- F.The upper plate surface could be regarded as part of the formwork for pouring the concrete . In order to prevent leakage,textile or soft wood may be used to fill the surround clearance between upper plate and formwork.This should be removed when removing the formwork.
- G. After the cast-in-site girder have hardened to designed strength, the four connecting steel plate should be removed to release the girder for normal movement and displacement before pre-stressing operation is conducted.
- H.For movable bearings, it is necessary to use alcohol or acetone to clean the stainless steel plate surface.Then fix the fence sleeve

2.For Pre-cast Girder

- Step A, B, C, D, E refer to above-mentioned steps as that for cast-in-site girders.
- F. As it is not convenient to preset fix holes on pre-cast girders,a steel plate could be pre-embedded.The steel plate'length and width dimension shall be 200 mm bigger than that of upper bearing of pot bearing. Take note that the steel plate should be welded with sufficient reinforcement and that some vent holes should be drilled.(Don't fix the tube at this moment)
 - G. When launch the girders , it should be stable and smooth and accurate. The embedded steel plate and upper plate of bearing should be intermittently and solidly welded together.It should be cautioned to protect thePTFEplate and silicone grease from damage caused by overheat.
 - H. Remove the four connecting steel plate and use alcohol or acetone to clean the stainless plate surface, and fix fence sleeve.

Pot Bearing Inspection and Maintenance

- 1.Once a year an inspection and maintenance should be carried out to the bearing during the bearing service.
2. Loosen bolts and inspect whether the bolt is broken.Clean its surface and lubricate it to prevent from rusting and fix it again.
- 3.Particularly make record of displacement for every bearing,and inspect whether the relative displacement are uniform not.
- 4.Repaint is required if paint on surface falls.
- 5.Clean off the garbage or dust around the foundation pad and use alcohol or acetone to clean the stainless steel plate.
6. Set up permanent test point to check bearing height changing, from which to verify abrasion of the PTFE plate. When the bearing height reduction is over 3mm, you need to examine the condition of the PTFE plate to see if it needs replacing were subject to change.

QZ Spherical Steel Bearings

Code Name for QZ Spherical Steel Bearings

QZ	←	the code name for this type of bearing
5	←	(KN)5:reacting force of the bearing(MN)
SX(DX,GD)	←	SX:multiway movable;DX:one-way movable;GD:fixed
e100	←	e:the design displacement,of ± 50, ± 100 and ± 150mm
θ 0.02	←	θ :the design rotation angle, of 0.02rad

This example shows a spherical bearing with the reacting force of 5MN , displacement of $\pm 100\text{mm}$, and turning angle of 0.02rad , multiway movable.

Characteristics of QZ Spherical Steel Bearings

The Spherical Bearing transfers force reliably and rotates smoothly. It not only has great bearing capacity, large displacement, etc. as the pot bearing, but also more suitable for bearings of large turning angles. Compared with the pot bearing, the spherical Bearing has the following advantages:

1. The bearing transfers force through the spherical surface, so no contraction of force will occur, and the reacting force on concrete is relatively even.
2. The bearing rotates through the sliding of the spherical PTFE plate, with less turning moment, which is only related to the radius of the spherical face and the friction coefficient of the PTFE plate. No subject to the turning angle of the bearing, so it is especially suitable for large turning angles. The design turning angle may be 0.05rad or more.
3. The turning features of the bearing are consistent in all directions so it is suitable for wide and curve bridges.
4. No rubber is used in the bearing, without rubber aging problem, which might affect the bearing rotation, makes the spherical bearing more suitable for cold areas.

Tech Index of QZ Spherical Steel Bearings

1. There are 30 different grades suitable for the following reacting force (vertical bearing capacity); 800, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 12500, 15000, 17500, 20000, 22500, 25000, 27500, 30000, 32500, 35000, 40000, 45000, 50000, 55000, 60000KN.



2. Design rotation angle θ : $0.01, 0.015$ and 0.02rad .

3. Design displacement:

along the bridge:

$e = \pm 50\text{mm}, \pm 100\text{mm}, \pm 150\text{mm}, \pm 200\text{mm}, \pm 250\text{mm}, \pm 300\text{mm}$.

across the bridge: SX multiway movable bearings are used, $e = \pm 40\text{mm}$.

The design displacement may be varied according to the requirements of work.

4. When the PTFE plate is lubricated with silicon grease, and the stress is less than approximately 30Mpa, the design friction coefficient is as follows: normal temperature [$-25^{\circ}\text{C} \sim 60^{\circ}\text{C}$]: 0.03, low temperature ($-40^{\circ}\text{C} \sim -25^{\circ}\text{C}$): 0.05.

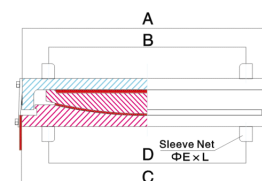
5. Horizontal bearing capacity For one-way movable bearings (DX), the capacity across the bridge is 10% of the reaction force of the bearing; for fixed bearing (GD), the capacity is 10% too.

6. Product catalogs of the seismic isolation device

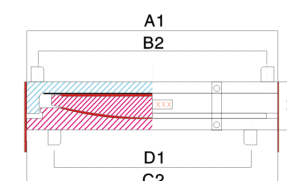
Specification QZ Spherical Steel Bearings (Details in Tables 1, 2 and 3)

Table 1: Dimension of Fixed Bearing (GD)

Type	Capacity (MN)	Structure size (Install size)							Sleeve Nut $\Phi E \times L$	Weight (kg)
		A、A1	B	B1	C、C1	D	D1	H		
QZ0.8GD	0.8	265	195	225	265	225	195	87	$\Phi 20 \times 100$	35
QZ1GD	1	300	210	260	300	260	210	89	$\Phi 20 \times 100$	46
QZ1.5GD	1.5	350	250	300	350	300	250	89	$\Phi 35 \times 150$	63
QZ2GD	2	395	290	345	395	345	290	90	$\Phi 35 \times 150$	80
QZ2.5GD	2.5	445	310	395	445	395	310	97	$\Phi 35 \times 150$	115
QZ3GD	3	480	340	420	480	420	340	98	$\Phi 40 \times 150$	134
QZ3.5GD	3.5	520	375	450	520	450	375	99	$\Phi 40 \times 150$	159
QZ4GD	4	540	400	480	540	480	400	109	$\Phi 40 \times 150$	194
QZ5GD	5	605	430	530	605	530	430	117	$\Phi 50 \times 200$	259
QZ6GD	6	665	480	590	665	590	480	132	$\Phi 50 \times 200$	361
QZ7GD	7	715	510	640	715	640	510	132	$\Phi 50 \times 200$	418
QZ8GD	8	765	555	670	765	670	555	155	$\Phi 60 \times 250$	562
QZ9GD	9	810	600	720	810	720	600	156	$\Phi 60 \times 250$	635
QZ10GD	10	855	630	760	855	760	630	157	$\Phi 60 \times 250$	710
QZ12.5GD	12.5	925	680	810	925	810	680	185	$\Phi 70 \times 300$	983
QZ15GD	15	1005	690	890	1005	890	690	188	$\Phi 70 \times 300$	1182
QZ17.5GD	17.5	1085	750	950	1085	950	750	190	$\Phi 80 \times 350$	1390
QZ20GD	20	1150	790	1020	1150	1020	790	196	$\Phi 80 \times 350$	1603
QZ22.5GD	22.5	1235	850	1090	1235	1090	850	211	$\Phi 90 \times 400$	2012
QZ25GD	25	1290	900	1140	1290	1140	900	223	$\Phi 90 \times 400$	2303
QZ27.5GD	27.5	1355	960	1200	1355	1200	960	225	$\Phi 90 \times 400$	2564
QZ30GD	30	1410	1010	1240	1410	1240	1010	232	$\Phi 100 \times 400$	2851
QZ32.5GD	32.5	1470	1070	1300	1470	1300	1070	247	$\Phi 100 \times 400$	3323
QZ35GD	35	1540	1140	1370	1540	1370	1140	253	$\Phi 100 \times 400$	372
QZ37.5GD	37.5	1585	1200	1410	1585	1410	1200	257	$\Phi 100 \times 400$	4000
QZ40GD	40	1655	1250	1450	1655	1450	1250	262	$\Phi 110 \times 450$	4428
QZ45GD	45	1760	1310	1550	1760	1550	1310	277	$\Phi 110 \times 450$	5344
QZ50GD	50	1870	1380	1670	1870	1670	1380	288	$\Phi 110 \times 450$	6233
QZ55GD	55	1950	1450	1720	1950	1720	1450	307	$\Phi 120 \times 450$	7263
QZ60GD	60	2050	1530	1820	2050	1820	1530	308	$\Phi 120 \times 450$	8052



across the bridge



along the bridge

Table2:Dimension of One-way Movement Bearing(DX)

Type	Capacity (MN)	Structure size (Install size)(mm)																Sleeve Nut ΦE×L	Structure size(Install size)(mm)						Transverse displacement (mm)	Weight(kg)						
		A	B	C、C1	D、D1	A1						B1				H																
QZ0.8DX	0.8	288	175	220	185	305	405	505				270	370	470				87	Φ20×100	±50	±100	±150				±3	36	41.3	46.6			
QZ1DX	1	322	195	250	210	330	430	530				295	395	495				89	Φ20×100								45.3	51.2	57.2			
QZ1.5DX	1.5	378	230	296	245	370	470	570				330	430	530				89	Φ35×150								69.1	76.2	83.2			
QZ2DX	2	425	270	343	290	410	510	610				370	470	570				90	Φ35×150								86.9	94.3	102			
QZ2.5DX	2.5	482	280	390	340	450	550	650				410	510	610				97	Φ35×150								120	130	141			
QZ3DX	3	517	290	425	360	480	580	680				430	530	630				98	Φ40×150								141	152	163			
QZ3.5DX	3.5	556	330	460	390	510	610	710				455	555	655				99	Φ40×150								163	174	186			
QZ4DX	4	585	350	483	420	530	630	730				480	580	680				109	Φ40×150								200	215	229			
QZ5DX	5	654	380	542	465	580	680	780				520	620	720				117	Φ50×200								274	290	307			
QZ6DX	6	712	440	600	525	630	730	830	930			570	670	770	870			132	Φ50×200								370	390	411	431		
QZ7DX	7	769	470	647	570	670	770	870	970			610	710	810	910			132	Φ50×200	426	448	471	494									
QZ8DX	8	814	480	692	595	710	810	910	1010			640	740	840	940			155	Φ60×250	577	604	631	658									
QZ9DX	9	861	520	729	635	740	840	940	1040			670	770	870	970			156	Φ60×250	640	669	698	727									
QZ10DX	10	906	560	764	670	770	870	970	1070			700	800	900	1000			157	Φ60×250	703	734	765	797									
QZ12.5DX	12.5	991	600	843	730	850	950	1050	1150			760	860	960	1060			185	Φ70×300	1010	1047	1085	1122									
QZ15DX	15	1070	670	912	800	920	1020	1120	1220	1320		830	930	1030	1130	1230		188	Φ70×300	1195	1236	1277	1319	1360								
QZ17.5DX	17.5	1158	700	990	855	980	1080	1180	1280	1380		880	980	1080	1180	1280		190	Φ80×350	1430	1475	1519	1564	1608								
QZ20DX	20	1227	760	1049	915	1040	1140	1240	1340	1440		940	1040	1140	1240	1340		196	Φ80×350	1638	1685	1733	1780	1827								
QZ22.5DX	22.5	1314	800	1126	975	1100	1200	1300	1400	1500		990	1090	1190	1290	1390		211	Φ90×400	2061	2118	2175	2232	2289								
QZ25DX	25	1378	860	1176	1025	1150	1250	1350	1450	1550		1040	1140	1240	1340	1440		223	Φ90×400	2347	2407	2467	2527	2593								
QZ27.5DX	27.5	1455	910	1243	1090	1200	1300	1400	1500	1600		1090	1190	1290	1390	1490		225	Φ90×400	2616	2680	2744	2808	2879								
QZ30DX	30	1504	910	1292	1115	1250	1350	1450	1550	1650	1750	1100	1200	1300	1400	1500	1600	232	Φ100×400	2909	2975	3041	3113	3180	3246							
QZ32.5DX	32.5	1568	960	1346	1170	1300	1400	1500	1600	1700	1800	1160	1260	1360	1460	1560	1660	247	Φ100×400	3347	3423	3498	3582	3658	3734							
QZ35DX	35	1642	1020	1400	1225	1340	1440	1540	1640	1740	1840	1200	1300	1400	1500	1600	1700	253	Φ100×400	3702	3784	3873	3955	4037	4119							
QZ37.5DX	37.5	1680	1050	1428	1250	1360	1460	1560	1660	1760	1860	1220	1320	1420	1520	1620	1720	257	Φ100×400	3922	4007	4100	4185	4271	4356							
QZ40DX	40	1759	1080	1497	1295	1420	1520	1620	1720	1820	1920	1260	1360	1460	1560	1660	1760	262	Φ110×450	4412	4508	4598	4687	4777	4866							
QZ45DX	45	1857	1160	1585	1385	1500	1600	1700	1800	1900	2000	1340	1440	1540	1640	1740	1840	277	Φ110×450	5216	5327	5429	5532	5634	5737							
QZ50DX	50	1973	1260	1691	1490	1580	1680	1780	1880	1980	2080	1410	1510	1610	1710	1810	1910	288	Φ110×450	6063	6172	6282	6392	6501	6611							
QZ55DX	55	2052	1290	1760	1535	1650	1750	1850	1950	2050	2150	1460	1560	1660	1760	1860	1960	307	Φ120×450	7048	7170	7292	7414	7536	7658							
QZ60DX	60	2150	1360	1848	1620	1720	1820	1920	2020	2120	2220	1500	1600	1700	1800	1900	2000	308	Φ120×450	7737	7866	7994	8122	8250	8379							

Note : The secondary displacement of the series is ±3mm

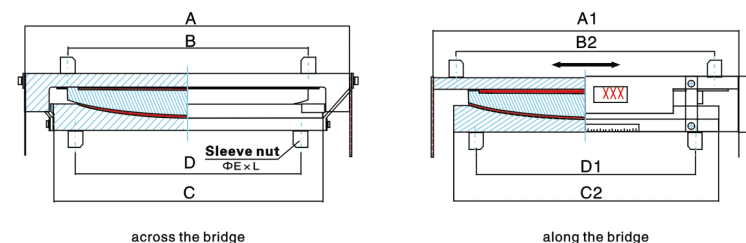
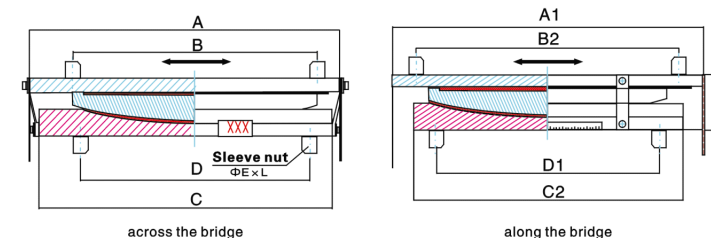


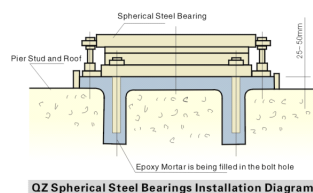
Table3: Dimension of Two-way Movement Bearing(SX)

Type	Capacity (MN)	Structure size (Install size)(mm)															Sleeve Nut ΦE×L	Structure size(Install size)(mm)						Transverse displacement (mm)	Weight(kg)					
		A	B	C、C1	D、D1	A1					B1					H														
QZ0.8SX	0.8	280	250	220	185	305	405	505				270	370	470				87	Φ12×100	±50	±100	±150		±40	30	33.5	37.2			
Qz1SX	1	305	275	250	210	330	430	530				295	395	495				89	Φ12×100						37.6	41.5	45.4			
QZ1.5SX	1.5	345	310	296	245	370	470	570				330	430	530				89	Φ14×150						52.2	56.6	61			
Qz2SX	2	385	320	343	290	410	510	610				370	470	570				90	Φ14×150						69	73.9	78.9			
QZ2.5SX	2.5	425	320	390	340	450	550	650				410	510	610				97	Φ18×150						97.9	105	112			
Qz3SX	3	455	355	425	360	480	580	680				430	530	630				98	Φ18×150						116	124	132			
QZ3.5SX	3.5	485	370	460	390	510	610	710				455	555	655				99	Φ18×150						136	144	152			
Qz4SX	4	505	400	483	420	530	630	730				480	580	680				109	Φ25×150						172	182	193			
Qz5SX	5	555	440	542	465	580	680	780				520	620	720				117	Φ25×200						226	237	249			
Qz6SX	6	605	480	600	525	630	730	830	930			570	670	770	870			132	Φ25×200						314	329	344	359		
Qz7SX	7	645	500	647	570	670	770	870	970			610	710	810	910			132	Φ35×200						366	382	398	414		
Qz8SX	8	685	520	692	595	710	810	910	1010			640	740	840	940			155	Φ35×250						493	512	531	551		
Qz9SX	9	715	560	729	635	740	840	940	1040			670	770	870	970			156	Φ35×250						544	564	584	605		
Qz10SX	10	745	600	764	670	770	870	970	1070			700	800	900	1000			157	Φ35×250						593	614	636	657		
QZ12.5SX	12.5	830	650	843	730	850	950	1050	1150			760	860	960	1060			185	Φ45×300						873	900	927	954		
Qz15SX	15	900	700	912	800	920	1020	1120	1220	1320		830	930	1030	1130	1230		188	Φ45×300	1033					1062	1092	1121	1150		
QZ17.5SX	17.5	960	740	990	855	980	1080	1180	1280	1380		880	980	1080	1180	1280		190	Φ45×350	1218					1249	1280	1311	1342		
Qz20SX	20	1020	800	1049	915	1040	1140	1240	1340	1440		940	1040	1140	1240	1340		196	Φ45×350	1405					1437	1470	1504	1537		
QZ22.5SX	22.5	1080	840	1126	975	1100	1200	1300	1400	1500		990	1090	1190	1290	1390		211	Φ45×400	1738					1776	1815	1855	1894		
Qz25SX	25	1130	920	1176	1025	1150	1250	1350	1450	1550		1040	1140	1240	1340	1440		223	Φ50×400	2004					2044	2085	2127	2175		
QZ27.5SX	27.5	1180	970	1243	1090	1200	1300	1400	1500	1600		1090	1190	1290	1390	1490		225	Φ50×400	2232					2274	2317	2360	2411		
Qz30SX	30	1230	980	1292	1115	1250	1350	1450	1550	1650	1750	1100	1200	1300	1400	1500	1600	232	Φ50×400	2487	2529				2574	2626	2672	2717		
QZ32.5SX	32.5	1300	1020	1346	1170	1300	1400	1500	1600	1700	1800	1160	1260	1360	1460	1560	1660	247	Φ50×400	2885	2935				2987	3048	3101	3154		
Qz35SX	35	1340	1080	1400	1225	1340	1440	1540	1640	1740	1840	1200	1300	1400	1500	1600	1700	253	Φ60×400	3180	3233				3295	3349	3404	3459		
QZ37.5SX	37.5	1360	1070	1428	1250	1360	1460	1560	1660	1760	1860	1220	1320	1420	1520	1620	1720	257	Φ60×400	3347	3400				3463	3519	3574	3630		
Qz40SX	40	1420	1150	1497	1295	1420	1520	1620	1720	1820	1920	1260	1360	1460	1560	1660	1760	262	Φ60×450	3737	3800				3858	3916	3974	4032		
Qz45SX	45	1505	1250	1585	1385	1500	1600	1700	1800	1900	2000	1340	1440	1540	1640	1740	1840	277	Φ60×450	4447	4519				4586	4654	4721	4788		
Qz50SX	50	1585	1330	1691	1490	1580	1680	1780	1880	1980	2080	1410	1510	1610	1710	1810	1910	288	Φ75×450	5245	5313				5384	5455	5526	5597		
Qz55SX	55	1655	1370	1760	1535	1650	1750	1850	1950	2050	2150	1460	1560	1660	1760	1860	1960	307	Φ75×450	6097	6173				6254	6334	6415	6496		
Qz60SX	60	1725	1420	1848	1620	1720	1820	1920	2020	2120	2220	1500	1600	1700	1800	1900	2000	308	Φ75×450	6696	6775				6859	6943	7027	7111		



Installation and Maintenance of QZ Spherical Steel Bearings

1. This series of bearings shall not be used on bridges where the concrete for the girder, pier and platform is lower than Grade 300 Unless specially approved by the designer.
2. The bearing shall be connected with the girder, pier and platform with the embedded bolts. If necessary, welding to the embedded Steel plate is allowed, but cautions shall be taken to prevent the PTFE plate and silicon grease being damaged by the heat from the Steel Bearing being welded.
3. The level of the Bearing after installation shall conform to the design and the supporting face shall be horizontal and smooth. The difference in height of the four corners of the supporting face shall not exceed 2mm.
4. When the bearing is delivered to the site, the packing list shall be examined, which includes the list of accessories, certificate of inspection, details for installation and maintenance, etc.
5. Attention shall be paid to the following during installation:
 - A. The centerline of the bearing shall be in parallel to the centerline of the girder.
 - B. The centerlines of the upper and lower bearing plates shall be coincident, and the crossing angle shall not be bigger than 5'.
 - C. During installation, the upper and lower connecting plates shall remain fixed to prevent overturning of the bearing. The connecting plates must be removed after installation of the girder is completed so that they may turn freely.
 - D. After the upper and lower connecting plates are removed, the rubber dust cover shall be fixed immediately on DX and SX movable bearings.
 - E. The connecting plate shall be removed after the whole insitu concrete girder is cast and before the girder is prestressed.
 - F. Before the fencing plate is erected, the sliding surface of the stainless steel shall be cleaned carefully with cotton waste to prevent dirt from entering the surface of the PTFE plate.
 - G. Where the paint is damaged this shall be reeated.
6. Regular inspection and maintenance shall be carried out to the bearing after it is put into use, usually once a year, which include:
 - A. Inspect whether the anchor bolt is broken, and whether there are any cracks in the sealing rubber.
 - B. Inspect whether the relative displacement of the bearing is even and note down the displacement of each bearing.
 - C. Remove the garbage or dust around the bearing and carefully clean the surface of the stainless steel with cotton waste.
 - D. Loosen the anchor bolt nut once, clean and oil it to prevent rusting, and then fix it again.
 - E. Check at a regular point the variation in the bearing height to see the abrasion of the PTFE plate inside the bearing. If the variation is larger than 3mm, remove the rubber sealing ring to examine the condition of the PTFE plate.



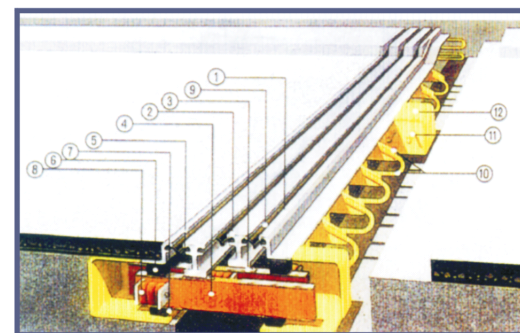
QZ Spherical Steel Bearings Installation Diagram

Type OVM-MFseries Expansion Joints

Type OVM-MF Series Expansion joint's Structure

This Expansion Joints type OVM-MF is developed by combining the advantages of homogeneous products domestic and abroad. It structurally comprises special Steel Profile, Rubber Sealers, Slide Pad, Press Pad, Spring, Displacement Box and Reinforcement, features in rational structure, big capacity, excellent water-proof and outside, high strength, long service life, simple installation and maintenance and so on. These joints are capable for keeping the roadbed smooth and level, no leakage in case expansion displacement effecting on the deck. With its technical advantages, smooth and stable driving on, reliable installation and perfect durability, it has dramatically taken place of other models of Expansion Joints. A single joint expansion capacity ranges from 0-80mm. The required total capacity can be achieved by combining several single joints.

Type OVM-MF Expansion Joint

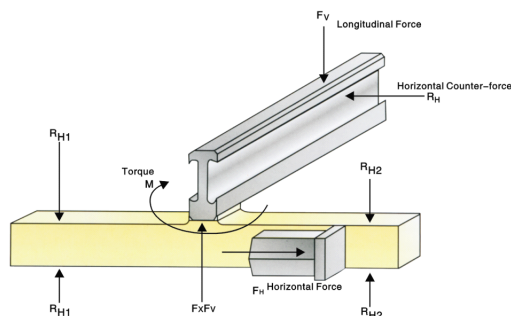


1. Side beam	7. Slide pad
2. Medisl beam	8. Spring
3. Medial beam connecting block	9. Waterproof rubber
4. Bearing crossbeam	10. Side beam reinforcements
5. Slider	11. Pin
6. Press pad	12. Displacement Box

Design Principle of Type OVM-MF Expansion Joints

Load Transferring System

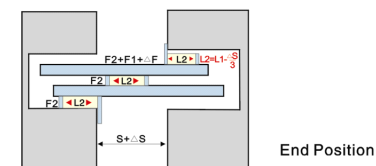
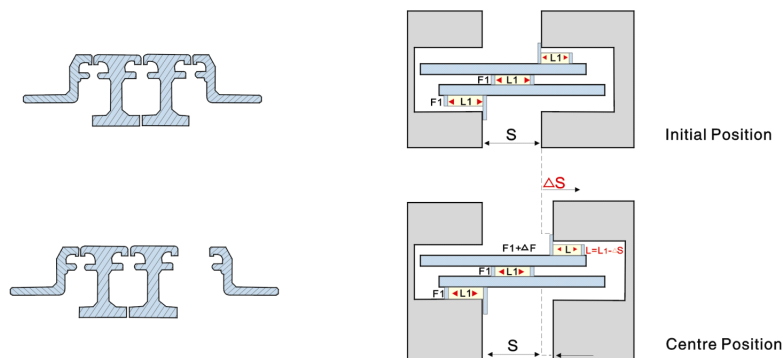
When a vehicle runs on the Expansion Joints, three forces load on the Expansion Joints.(showing in the following sketch).



The Medial Beams are placed and fixed on the Bearing Crossbeams between the ends of decks, from which a bearing grille system is formed to distribute and transfer the loads to the full area of the joints positioned. Meanwhile, the whole system is movable under the expansion and contraction occurring deck.

Elastic System

It is a sliding contact surface between the Crossbeam and Bearing Pad and the Sliding Pad. Because of the Spring property, it enable the Joints to fit the continuous deformation and keep the gutters width equivalently. (showing in the following sketch).



A.Spring: Being made of Polyurethane foam ,features in high tensile strength ,excellent shock resistance and longitude and transverse deformation.The compression capacity can satisfy 80% and maintain its elasticity permanently.It also can damp the impact and lessen noise.

B.Press Pad,Sliding Pad: Being made of neoprene rubber and steel plates reinforced intermediately.A elastic system is formed by fixing together the Press Pad on the Crossbeam and the beneath Bearing Pad.The press padis prepressing prevents the Crossbeamis falling from the Bearing Pad.A PTEF plate is lined on the sliding surface to reduce friction.The excellent elasticity and stiffness of the Pads can dramatically lessen the vehicle running vibration. It eliminate the incline load on the sliding surface in case incline deformation occurred on the Crossbeam.

Waterproof Property

The fine Rubber Strip is designed not only for sealing the clearance between the Beams, but also well fitting the expansion and contraction of the whole structure.It is tightly fixed in the recesses of Beams and antiloosing.

In case the gutter width is over 35mm,the rubber strips can be exchanged directly and no side effect would be cause to the structure.

Technical Property and Dimensions

Technical Parameters

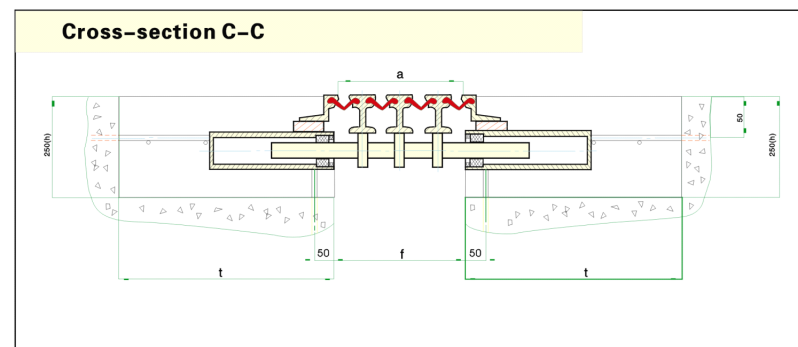
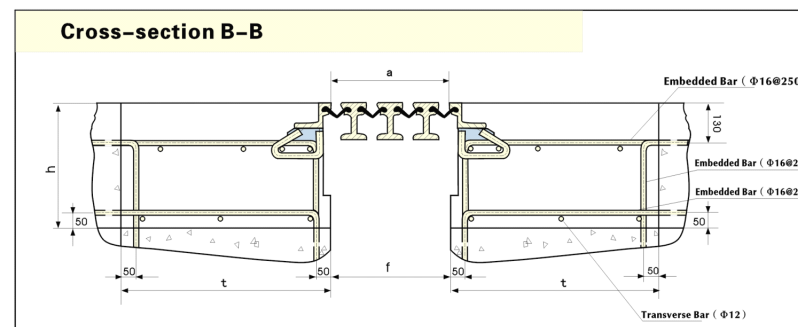
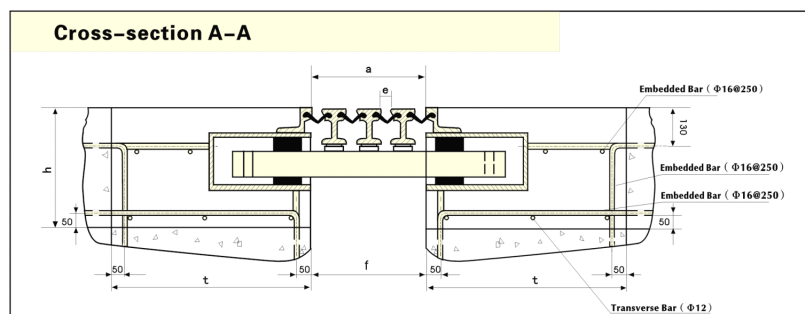
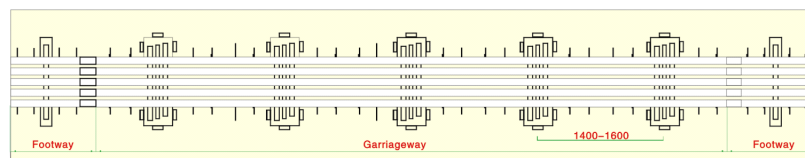
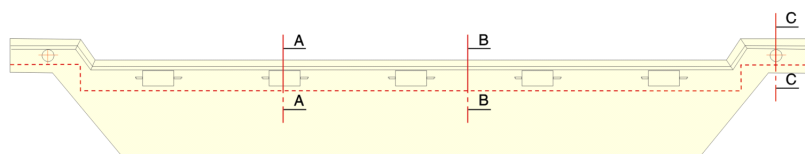
Expansion Resistance:It originates from the elastic deformation. Its growth is dependent to the quantity of

Rubber strips and springs for these partials are series connected

For Single Slit:Compression less than 1.0KN/m.Longitude Shear Stress less than 2.0KN/m.

For Multi-Slit:Compression less than 3.0KN/m.Tensile Stress less than 4.0KN/m. Longitude shear Stress less than 3.0KN/m.

Type	Qty. of slits	Max. Displacement	Interval	Dimensions in concrete cross section			Expansion Joint cross section Dimensions
				Lane	Side Pavement		
	n	U _{max}	f	h	t	(h)	a
OVM-MF80	1	80	10~90	250	300	250	0~80
OVM-MF160	2	160	80~240	350	350	250	80~240
OVM-MF240	3	240	160~400	400	440	250	160~400
OVM-MF320	4	320	240~560	420	525	250	240~560
OVM-MF400	5	400	320~720	420	690	250	320~720
OVM-MF480	6	480	400~880	420	780	250	400~880
OVM-MF560	7	560	480~1040	430	870	250	480~1040
OVM-MF640	8	640	560~1200	440	960	250	560~1200



Installation of Expansion Joints Type OVM-MF

1. Packing and Shipment

OVM Expansion Joints shall be finished in factory. Adjust and keep the slits according to the requirement of Customers. It should be bonded up to protect the integrated from loosening. The lifting points should be clearly marked. Transportation or move in partials is not allowed except that it is impossible to arrange integral shipment or exchanging the existing partials.

2. Storage

The Expansion Joints shall be loaded and unloaded properly. Leveled out to load and unload and place. If the Joints not being installed at once, they should be placed on skids and covered to avoid damage or contamination, specially keep away any fouls being into the Displacement Controller.

3.Pre-setting Gutters

Before erection , according to the instruction charts and data , gutters and steel reinforcements should be pre-set and fixed at the position where Joints to be installed (where the value of δ to be determined according to the site temperature). The pre-set steel reinforcements ' installation error shall be less than 20 mm , the bed-in-concrete depth is not less than $30d$ (d -diameter of steel reinforcement).The Displacement Controller should be reinforced to prevent from tearing off.The reinforcements should be properly placed to make Joints fixed smoothly.

4.Installation

OVM Expansion Joints are finished in factory . However , if it is hard to move due to the big total length or have to be installed in phase by phase ,it can be divided into segments and erected at sites. Adjust the slits width as per the site temperature . Have them fixed on the decks according to the installation chart and instruction. Before installation carefully check the preparatory works such as lifting devices, welding devices, assistant workers . We prefer to,provide technical assistance to ensure the construction quality.

Installation Procedure in Detail:

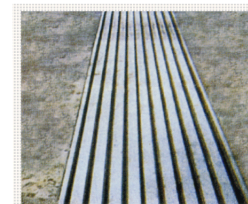
- 1 reinforcement available to position the Displacement Box.The pre-set gutter width should be a little bigger than that of Joints.
2. Adjust the slits width as per the site temperature with special tools and reliably keep the width by clamps.
3. Lifting points should be located at the Joints central line.Lift and move the Joints to the installation positions and adjust the height marks.Ensure the top surface of Joints in the same plane to the deck surface and match the slope in deck transverse direction.Have the Joints central line coinciding to the gutters axis.Steel bars-16mm or bigger shall be welded upright on the box to maintain height and cross bars to maintain straightness.
4. When the Joints is right placed,have the Side Beam reinforcement welding to the bedded reinforcement.In the first step,point-weld at intervals of 2-3 reinforcement till both side Beams being finished to have the whole Joint fixed.Then permanent welding follows.Also cross steel bars needed to be placed and welded to reinforce the structure.Random welding on the steel beams is not allowed,for which could cause damages.
5. If the Joints installed by segments,the connecting surface should be welded by advanced welder.After the total length is finished,follow the above description in(4).
6. After the Joints are fixed in the gutters erect the Rubber Strips.If the slits width is too small to erect the rubber strips,they should be erected before fixing the Joints.After the Joints is fixed,formwork need to be made.

7. According to overall dimensions of Joints and gutters.The formwork material shall be thin steel plate(2-3mm)or polystyrene plastics.Properly place the formwork to protect grout from into the Displacement Box.The Joints should be covered to prevent grout flow into the rubber strips.After the preparatory works,once again check the Joints evenness,central line,height and slits,etc,to meet the requirement.Put C50 concrete into the pre-set gutters with vibration.Ensure full stuffing beneath the Displacement Box.After the concrete is hardened,discharge the formworks and camps.Lay down waterproof material and roadbed.
8. The waterproof material and roadbed should be made along with the whole bridge road bed at the same time.Before the roadbed work,the Joints should be covered by wooden plate to avoid any ruins until the beneath concrete reaches the required compression strength under the temperature of 20°C for seven days.

When make the roadbed,the sealing parts of Joints should be under well protection.The roadbed contacted to the Side Beams should be compacted and in the same plane with the top surface of Side Beams.After the work is finished,the roadbed surface shall be above the top surface of Side Beams.For concrete roadbed,the difference is less than 2mm,for bituminous roadbed,5mm less.Cracks between the Side Beams and roadbed is not allowed to ensure vehicle smooth running and avoid leakage to cause internal partials rusty.

Maintenance

1. According to the permanent maintenance condition,frequently clear off contaminate in the sealing Rubber Stripsto avoid ruins,Substitution should be carried out in case damages happened on the rubber strips.
2. Frequently check if any cracks ,damages or leakage occurs at the contact surface between the Side Beams and roadbed. Timely repairing is necessary.
3. In case the top surface of Joints is not in leveling , possibly the Bearing Pad or Press Pad failed .Necessary repair should followed.
4. Frequently check the slits width and the Displacement Box.Damaged partials should be substituted timely.
5. Regulars anti-rust treatment should be carried out to ensure the Joints service,durability and reliability.



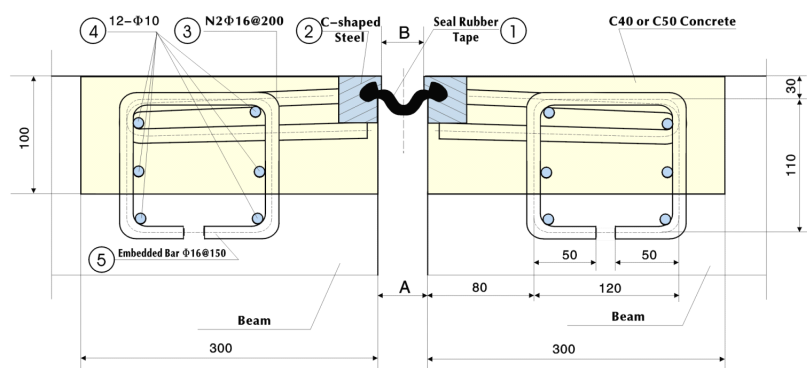
Low-bedding expansion joints

These are new products of our company. Generally, they are mainly consisted of three parts : the hot-rolled special-shaped steel profile, rubber sealing strip and reinforcement; Feature in simple structure, easy installation, excellent durability and reliability, etc. Due to its small height, they preferably suit to remake existing Expansion Joints, and also available for new bridge construction. Structural forms : there are various forms of reinforcement for Type C, F, E, Z, M. Special structure can be revised as per clients demand or actual requirement.

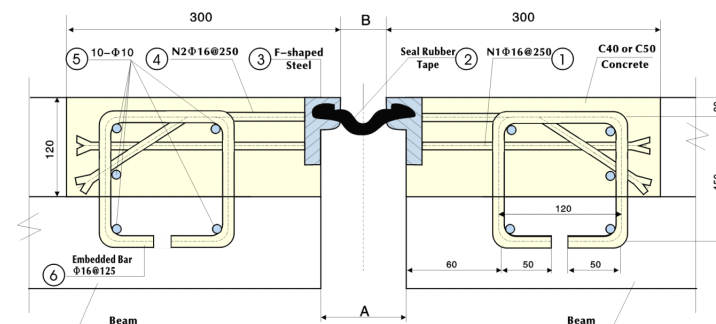
Low-bedding Expansion Joints

Item Specification	Displacement Amount (mm)			Expansion Resistance (KN/m)		Installation size (mm)	
	Horizontal Displacement	Vertical Displacement	Horizontal Shear Displacement	Compression	Longitudinal Shearing	A	B
OVM-C	30	± 12	± 20	≤ 4	≤ 6	10-40	0-30
	50					10-60	0-50
	60					10-70	0-60
	80					10-90	0-80
OVM-F	30	± 12	± 20	≤ 4	≤ 6	52-82	0-30
	50					52-102	0-50
	60					52-112	0-60
	80					52-132	0-80
OVM-E	80	± 12	± 20	≤ 4	≤ 6	10-90	0-80
OVM-Z	80	± 12	± 20	≤ 4	≤ 6	10-90	0-80
OVM-M	80	± 12	± 20	≤ 4	≤ 6	10-90	0-80

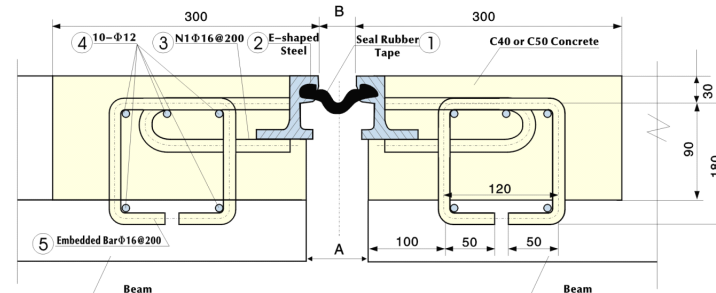
Type OVM-C Expansion Joint



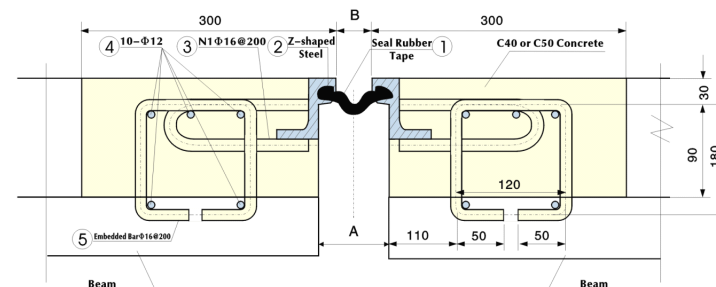
Type OVM-F Expansion Joint



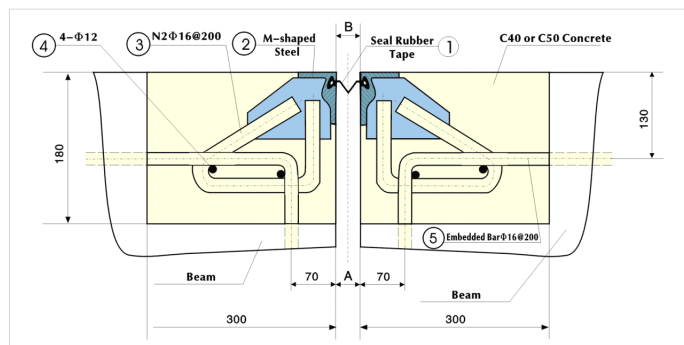
Type OVM-E Expansion Joint



Type OVM-Z Expansion Joint

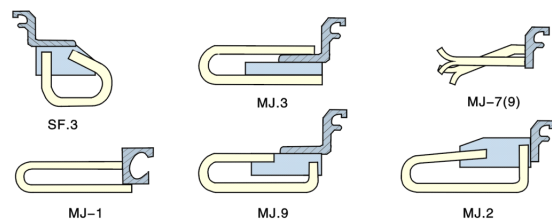


Type OVM-M Expansion Joint



Installation

The load from vehicle on Expansion Joints should be effectively transferred to the Concrete base through the proper placed reinforcments which should be firmed to bridge decks. The following diagram demonstrates several instatllation methods.



OVM Series Rubber Expansion Joints

Performance and Features

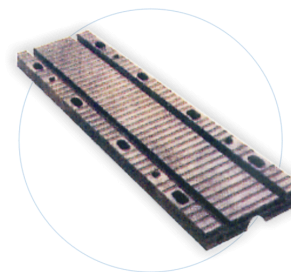
The Laminated Rubber Expansion Joints is designed and manufactured by taking advantages of rubber's low shear module. Rubber's shear deformation and causing little counter-force can well fit the expansion displacement of bridge decks and contribute to the bridge structure. Steel plate reinforced, assembled by segments, connected by bolts, is features reliable installation, smooth driving, little weight, excellent waterproof function and durability.

Applicable temperature ranges:

For Polychloroprene Rubber: +60℃~-25℃

For Ethylene-Propylene Terpolymer: +60℃~-40℃

Dimensions Expansion Joints



Type	(Width × height × length)	Expansion Capacity
F230	F230 × 35 × 1250	+15 -15
F250	F250 × 45 × 1250	+22.5 -22.5
F270	F270 × 42 × 1500	+25 -25
F260	F260 × 50 × 1200	+30 -30
F303	F303 × 50 × 1200	+32.5 -32.5
F430	F430 × 54 × 1200	+40 -40
F550	F550 × 54 × 1250	+50 -50
F706	F706 × 70 × 1200	+80 -80

Note: The Expansion Joints that required by customer may be supplied. For example: F881 × 1200
F1185 × 1800 F1185B × 1800

Physical Property Parameters of Rubber for the Expansion Joints
(According with Standard JT)

Items	Polychloroprene rubber	Natural rubber
Hardness (IRHD)	60 ± 5	60 ± 5
Tensile strength (MPa)	≥ 15	≥ 16
Elongation at break (%)	≥ 400	≥ 400
Brittle temperature (°C)	≤ -40	≤ -50
Permanent deformation at constant compression (room temperature) × 22h (%)	≤ 20	≤ 20
Ozone resistance ageing, 20% of elongation, 40 °C × 96h	50pphm	25pphm
	No cracks	No cracks
Hot air-oven ageing test	Testing conditions (°C × h)	70 × 96
	Reduction of tensile strength (%)	± 15
	Reduction of elongation at break (%)	± 25
	Hardness changeable range (IRHD)	0 ~ +10
Peel strength of rubber bonded to steel plate (KN/m)		> 7

Physical Property Parameters of Rubber for the Expansion Joints (According with Standard AASHTO)

Items		Requirement
Hardness (IRHD) ASTM D2240		55 ± 5
Tensile strength (MPa) ASTM D412		≥ 13.8
Elongation at break (%) ASTM D412		≥ 250
Peel strength of rubber bonded to steel plate (KN/m) ASTM D429,B		≥ 7
Low temperature Brittleness (°C) ASTM D746		≤ -40
Permanent deformation at constant compression100℃ × 22h (%) ASTM D395		≤ 35
Ozone resistance :300pphm in air,20% of elongation, 40℃ × 70h ASTM D1149		No cracks
Hot air-oven ageing test 100℃ × 70h ASTM D573	Reduction of tensile strength, Maximum (%)	< 20
	Reduction of elongation at break, Maximum (%)	< 20
	H ardness changeable range, Maximum Points (IRHD)	< 10

Construction Requirement

A.Smoothness

If the joints device is installed unevenly or the bridge deck is sagged at end, the impact will occur when vehicle pass through the joint. To assure the smoothness of joint, the level of joint have to be monitored strictly by positioning system, after installation. The joint device shall be about 1~2mm above the decking surface, the joint over to the decking surface is impermissible.

B.To increase the concrete strength between the joint and decking pavement

The installation process of plate-type of rubber expansion joints require a 30 cm wide concrete transition section at the easy to be destroyed. Therefore, the concrete there have to be reinforced and reached grade 425, especially in groove steel and other components is added.



When vibration, the concrete under the rubber plate shall be compacted, and the both side of joint device. As the transition section is the position where joint device embedded and the transition area of rigid decking to flexible rubber plate, the concrete there is very honeycomb cavity or crack shall be avoided.

C.The embedded bolt shall be fasten

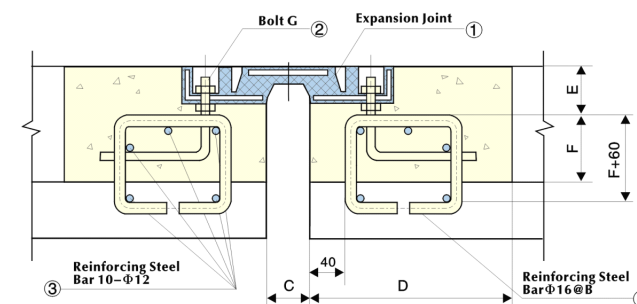
The joint device is fixed with decking by embedded bolt, and the anchor bolt bear the horizontal force repeatedly, so the bolt have to be fast. If any neglect occurred in installation, the bolt is easy to be broken by cutting or pulling, and then the longitudinal reinforcement shall be welded with the anchor reinforcement of girder as well, and so Enhance the bolt joint device will be damaged. In construction the bolt is required to be welded fast with longitudinal reinforcement, and strength and transfer the force to the girder.

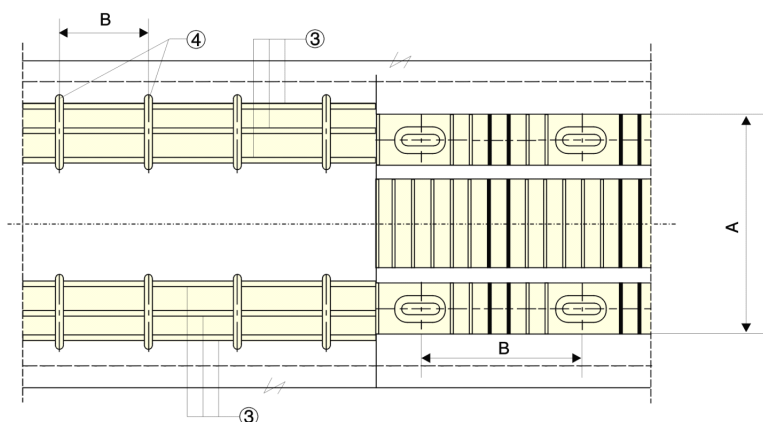
The Parameters of Expansion Joints Installation

Table 1

Total movement X(mm)	Type	A (mm)	B (mm)	C Min~Max (mm)	D (mm)	E (mm)	F (mm)	G
30	F230	230	250	10~40	≥400	50	80	M12
45	F250	250	250	15~60	≥410	60	80	M12
50	F270	270	250	15~65	≥420	60	80	M16
60	F260	260	300	20~80	≥410	70	80	M16
65	F303	303	300	20~85	≥430	70	80	M16
80	F430	430	300	25~105	≥480	80	80	M20

30~80



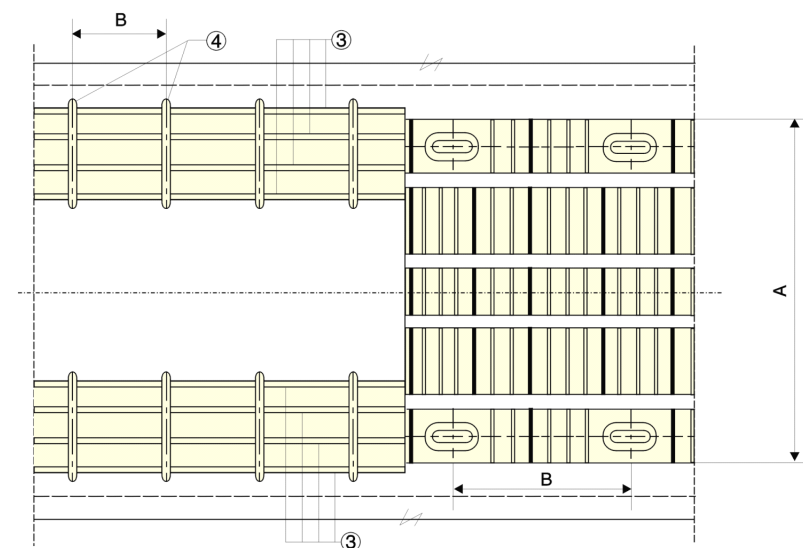
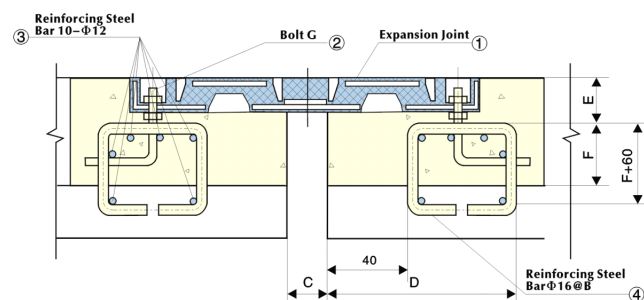


The Parameters of Expansion Joints Installation

Table 2

Total movement X(mm)	Type	A (mm)	B (mm)	C Min~Max (mm)	D (mm)	E (mm)	F (mm)	G
100	F550	550	250	30~130	≥540	80	80	M20
160	F706	706	300	50~210	≥590	100	100	M22
200	F1185	1185	300	60~260	≥820	120	120	M22
260	F1185B	1185	300	80~340	≥850	160	120	M22

100~260



SWF Finger Expansion Joints

Structure of SWF Finger Expansion Joints

SWF finger expansion joints are carefully developed by Liuzhou Orient Engineering Rubber Products Co., Ltd. It is the result of combining characteristics of all kinds of steel finger expansion joints at home and abroad, as well as studying the installation methods of kinds of expansion joints. It is mainly composed by special steel plates, rubber sealers, and high strength anchor bolts, etc.

The characteristics and features of SWF finger expansion joints.

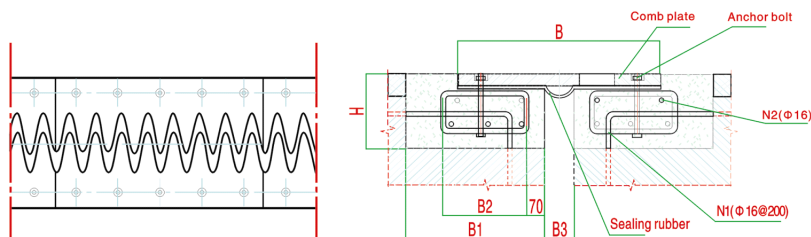
1. These expansion joints are adopted strict waterproofing measures, so it has excellent waterproofness which can effectively prevent bridge structure erosion caused by waterleak and keep the fine appearance.
2. The expansion joints has the characteristic of compact structure with symmetrical form, which is of material saving, low cost as well as economic and practical.
3. The expansion joints feature novel design, eliminate vehicle bumping conditions thoroughly from the structural point and reduce the impact force to the bridge caused by vehicles, which results in a nice roadability and free from shock and noise with a good antishock action.

4. The expansion joints are easy for installation and construction. All the material are durable and adopted all kinds of protective practices against breakage. The rubber sealer is under the finger steel plate, which is durable. The whole set of expansion joints are normally free from maintenance, which greatly reduce the cost of maintenance.

The simple design requirements of the SWF expansion joints

1. The displacement of the expansion joints varies from 0mm to 300mm. The overall dimensions should be decided according to the actual bridge displacement.
2. The expansion joints feature novel design, lightweight structure, and have the displacement box without strictly requirements in dimensions. No special treatments on the beam ends. The specifications of the normal products, as well as the dimensions for the pre-set groove are as followings: (The following dimensions are the installation dimensions under the condition of mean annual temperature.)

Type	Displacement C mm	Width B mm	preset groove width] B1 mm	present steel bar width B2 mm	gap between beam ends B3 mm	preset groove height H mm
SWF80	80	480	460	290	60	≥200
SWF100	100	510	470	300	70	≥200
SWF120	120	540	480	310	80	≥200
SWF140	140	570	490	320	90	≥200
SWF160	160	600	500	330	100	≥200
SWF180	180	630	510	340	110	≥200
SWF200	200	660	520	350	120	≥200
SWF220	220	690	530	360	130	≥200
SWF240	240	720	540	370	140	≥250
SWF260	260	750	550	380	150	≥250
SWF280	280	780	560	390	160	≥250
SWF300	300	810	570	400	170	≥250



Model selection and order for SWF expansion joints

Model selection: According to actual bridge displacement.

Order: The displacement of the expansion joints should be clearly pointed out in the contract, as well as the local highest & lowest temperature and installation temperature in order for manufacture to design. Client also should provide the layout of the bridge to the supplier. In the layout, the width, slope, sidewalk, thickness of bridge deck pavement, the requirements to the expansion joints at the guard bar, as well as the probable time of the installation, the temperature rangeability should be noted in order to correctly design and process.

Installation and maintenance of the SWF expansion joints

Installation: Normally supplier provides the installation services for the SWF expansion joints. In special case the supplier just provides the installation guidelines.

Maintenance: Normally without special maintenance for the SWF expansion joints.

ZSF Finger Expansion Joint

I. Structure

It is mainly composed of fine steel finger plate and profile steel sealer set.

1. Fine steel finger plate
It consists by high-grade steel plates of identical thickness according to the required contractility. It is subjected to special anti-rusty treatment to satisfy multifunction requirement of ZSF expansion joint.
2. Steel profile sealer strip
It uses mature profile steel to make sealing set with good water protection. It is continent to connect finger plate, easy installing and reliable.
3. Rubber seal
It is made of age enduring rubber.
4. HT bolt
Dimension and quantity to be specified according to expansion value.

II. Function and Characteristics

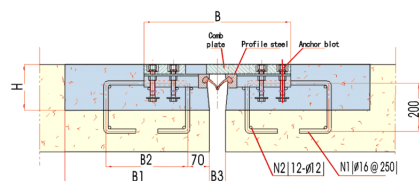
1. It uses mature profile steel and a rubber seal to make the construction waterproof. It effectively prevent from soaking and causing corrosion to bridge structure (esp. bearings) but well maintain bridge neatness.

- 2.Compact structure, symmetric arrangement, economic and ease of installation.
- 3.Optimized design on structure which completely eliminates an uneven surface and reduces impact from vehicles. Provides non-vibrating, quiet and comfortable driving condition, as well as performing well during seismic activity.
- 4.This expansion joint is easy to install and requires little maintenance. The use of specially treated age enduring materials mean the joint has a long design life. The sealing set underneath the finger plates can also stand aging well. The whole joint is designed to be low on maintenance, thus saving cost during its design life.

III. Design requirements

- 1.Expansion capacity 0~1000mm, the overall dimension to be defined as per actual expansion value on bridge.
- 2.This expansion joint features optimized design, compact structure, no displacement box, no need for pre-treatment of girders. For those commonly used with 0~360mm expansion capacity, the dimensions and pre-set grooves sizes are shown in following table.

Type	Expansion value C (mm)	Width B (mm)	Groove width B1 (mm)	Deformed bar width B2 (mm)	Girder gutter B3 (mm)	Preset groove height H (mm)
ZSF 80	80	480	520	300	40	≥200
ZSF 120	120	540	540	320	60	≥200
ZSF 160	160	600	560	340	80	≥200
ZSF 200	200	660	580	360	100	≥200
ZSF 240	240	820	650	430	120	≥250
ZSF 280	280	880	670	450	140	≥250
ZSF 320	320	960	700	480	160	≥250
ZSF 360	360	1020	720	500	180	≥250



The structure of ZSF type finger Expansion Joints

IV. Selection and Order Notes

Selection : As per actual expansion value on bridge to make selection.

Order note: In purchase order, the required expansion value, local max. & min. temperature as well as installing temperature should be clearly mentioned for reference to manufacturer. Customers are also required to provide bridge layout planning, width, slope, pedestrian, upper cover thickness, special requirements at handrail, temperature changing during installation, etc for reference for carrying out proper design and manufacturing.

V. Installation and Maintenance

Installation: Generally, manufacturer provides installing services, or installation assistances.

Maintenance: During regular maintenance work of the bridge, frequently remove accumulated dust and gravels to avoid effect on free expansion and damage to finger plate or seal leakage. Regularly inspect the anchor bolts for damage, and look for cracks or leakage at the joint between the finger plate and the deck concrete. If it occurs, it is required to carry out timely repairs. Take regular anti-rust measures to assure the expansion joints are in normal working condition.



ZSF Expansion Joint under installation

Installation Notes

1. This expansion joint is usually supplied in length of half-road width and to be combined at site. Reinforced concrete (strength higher than C40) will be continuously placed.
2. For a two-lane motorway deck, standard EJ segments are laid from deck centerline and stretch out to the deck edges. The nonstandard EJ segments are installed at both deck edges.

3. Identify the locations for the anchor bolts and weld them the steel to reinforcement. Then fix the Moulding Board. (cautions to control finger plate surface level)
4. layout reinforcement net, pour first stage of reinforced concrete with strength over C40. Level concrete surface under finger plate, then install finger plates. Pour concrete and ensure it is level to the deck surface.
5. After C40 concrete is sufficiently hardening, remove the Moulding Board. Clear off concrete surface. In sequence, first install the rubber seals then the finger plates.
6. The anchor bolt holes should be filled and sealed with epoxy resin.

SF Finger Expansion Joint

I. SF Expansion joint structure

Its main components are finger plate, wearable set, elastic water proof set and transition strip.

1. Fine-made finger steel plate

Steel plate thickness is selected as per expansion value, subject to antirust treatment.

2. Wearable set

Stainless steel plate which is hard wearing and has good anti-corrosion properties.

3. Water proof set

Made in rubber with excellent aging performance.

4. HT bolt

Dimensions defined as per expansion value.

5. Transition section

It is located between the SF expansion joint and deck top dress. Its functions is to transfer the load to deck and beams. It is set in high-strength reinforced concrete using a special installation procedure.

II. Function and Characteristics

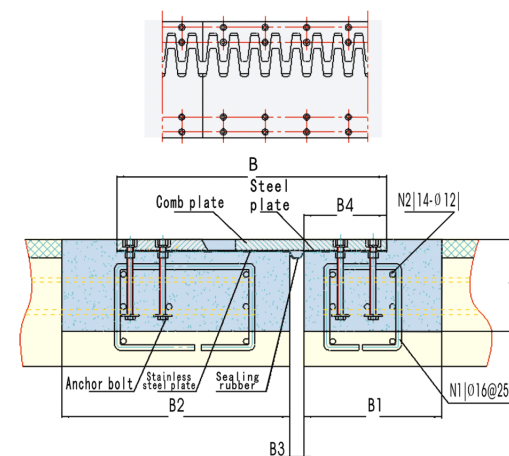
1. Ensures the construction is waterproof. It effectively prevents the bridge structure (esp. bearings) from getting wet and thus prevents corrosion.
2. The joint is designed to automatically remove the contaminants out of the joint gutter, no need manually clean and enable the bridge girder free expansion.
3. Optimized design eliminates an uneven surface and reduces impact from vehicles. Provides non-vibrating, quiet and comfortable driving conditions.
4. The use of specially treated age enduring materials ensures the joint has a long design life. The whole joint is designed to be low on maintenance, thus saving cost during its design life.

III. Road Design Requirement

1. Expansion capacity 0~400mm, the overall dimension to be defined as per actual expansion value on bridge.
2. This expansion joint features optimized design, compact structure, no displacement box, no need for pre-treatment of girders. For those commonly used with 0~400mm expansion capacity, the dimensions and pre-set grooves sizes are shown in following table (the following structure dimensions are set under annually average temperature).

SF Finger Expansion Joint

Type	Expansion capacity C (mm)	Width B (mm)	Preset groove B1 (mm)	Reinforcement width B2 (mm)	Beam ends gutter B3 (mm)	Installation site B4 (mm)	H Depth (mm)
SF 80	80	660	500	670	60	230	≥200
SF 120	120	760	500	750	80	230	≥200
SF 160	160	860	500	830	100	230	≥200
SF 200	200	1000	570	910	120	270	≥200
SF 240	240	1180	570	1070	140	270	≥250
SF 280	280	1280	570	1150	160	270	≥250
SF 320	320	1420	610	1230	180	310	≥250
SF 360	360	1520	610	1310	200	310	≥250
SF 400	400	1620	610	1390	220	310	≥250



the structure of SF type finger Expansion Joints

IV. Selection and Order Note

Selection : As per actual expansion value on bridge.

Order note: In purchase order, the required expansion value, local max. & min. temperature as well as installing temperature should be clearly mentioned for reference to manufacturer. Customers are also required to provide bridge layout planning, width, slope, pedestrian, upper cover thickness, special requirements at handrail, estimated installation time, temperature changing during installation, etc for reference for carrying out proper design and manufacturing.

V. Installation and Maintenance

Installation: Generally, manufacturer provides installing services, or installation assistances.

Subject to no special maintenance.

Maintenance: During regular maintenance work of the bridge, regularly inspect the anchor bolts for damage, and look for cracks or leakage at joint between the finger plate and deck concrete. If it occurs, it is required to carry out timely repairs. Take regular anti-rust measures to assure the expansion joints are in normal working condition.



the drawing of SF type comb Expansion Joints.

Installation Notes

1. Reinforced concrete this expansion joint is usually supplied in segments and to be combined at site. Steel fiber concrete (strength higher than C40) will be used placed in two layers.
2. For a two-lane motorway deck, standard EJ segments are laid from deck centerline and stretch out to the deck edges. The nonstandard EJ segments are installed at both deck edges.
3. Identify the locations for the anchor bolts and weld them to the steel reinforcement.
4. To install mould plates, pour first stage of reinforced concrete with strength over C40. Level concrete surface and ensure it is H lower than deck level. (H is the total thickness of rubber plate, stainless steel plate & finger plate). After the concrete is sufficiently hardened, enough strong, remove mould plates.
5. Install the rubber plate, pour stainless steel plate and finger plate, place second stage concrete C40. Leveling concrete surface equal to the deck level.
6. The anchor bolt holes should be filled and sealed with epoxy resin.