



# B2 product catalogue

- ..... pot bearings
- ..... elastomeric bearings
- ..... spherical bearings
- ..... modular expansion joints
- ..... finger expansion joints



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**B2 Sp. z o.o.** was established in 2010. It deals with selecting, producing and assembling expansion joints and bearings for bridges:

- modular expansion joints **B2W** made of non-alloy steel (single seal and modular expansion joints)
- modular expansion joints made entirely of non-alloy or stainless steel (**B2NS**) or partly of non-alloy or stainless steel (**B2NN**) so called hybrid profiles (single seal and modular expansion joints)
- finger expansion joints **B2P**
- pot bearings
- elastomeric bearings
- spherical bearings
- lifting structures, including bearings exchange

We are a start-up with well-experienced team. Bearings and expansion joints we deliver are made by Polish production plants. They are of top quality which is guaranteed by Factory Production Control.

Expansion joints we offer have Technical Approvals issued by Road and Bridge Research Institute in Warsaw. B2 Sp. z o.o. bearings are produced according to EN 1337 Standard, which is acknowledged by Conformity Certificate issued by Karlsruher Institut für Technologie: Materialprüfungs- und Forschungsanstalt.

B2 Sp. z o.o. has wide experience in supplying products both to the European Union and beyond its borders. Among others, we executed a delivery of expansion joints within the road connection between Zittau and Hradek by the Neisse River including connection to the Polish road network (road connection in Neisse Euroregion: Task II – part 3) and bearings production for Fen Lisesi Bridge in Ankara.

We cooperate with the biggest contractors in Poland such as Bilfinger Infrastructure, Skanska, Strabag, Mota-Engil Central Europe, Dragados, Pol-Aqua, Mostostal Warszawa, Warbud or Budimex. We would appreciate cooperation with your company also!



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# pot bearings

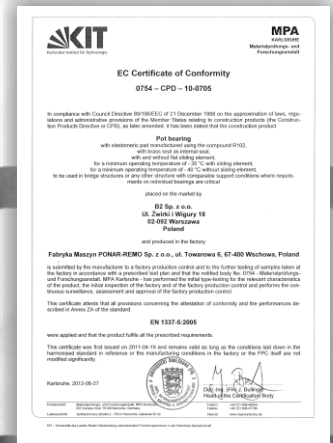
B2 Sp. z o.o. pot bearings are intended for application in bridges and engineering structures. They can be used in the temperatures between  $-40\text{ }^{\circ}\text{C}$  and  $50\text{ }^{\circ}\text{C}$ . Bearings, depending on their type, take over the following impacts from the structure of the deck: vertical force, horizontal forces (longitudinal and transverse), movements (longitudinal and transverse), as well as rotation angle. Pot bearings constitute the most frequently used types of structure supports. They are characterized by high load-bearing capacity, small dimensions, ease of assembly and maintenance inspections.

Our company offers the following types of pot bearings:

- fixed (**FX**)
- free sliding (**GL**)
- guided sliding (**GG**)



B2 Sp. z o.o. pot bearings have a Conformity Certificate No. 0754-CPD-10-0705 issued by Karlsruher Institut für Technologie, according to the Standard EN 1337. The bearings have a 5-year guarantee. They have a 20-year life cycle required by the regulation issued by the Polish Minister of Transport and Maritime Economy of 20 May 2000.



Bearings made by our company carry maximum vertical load of up to 50 000 kN (ULS). The standard value of acceptable rotation angle is 0,01 rad. Each bearing with the movement of at least  $\pm 50\text{ mm}$  has additional standard reserve of  $\pm 20\text{ mm}$ .

B2 Sp. z o.o. pot bearings are equipped with nominal plates that include basic information: name of bearing, vertical and horizontal load capacity, movements and rotation angle, as well as place of production and name of the producer. Sliding bearings are additionally equipped with longitudinal movement indicators.

For the structures made of prestressed concrete it is recommended to give presettings to the selected bearings. Presettings can be applied also due to assembly temperature other than initially predicted. Bearings assembly temperature is stated in the Standard EN 1991-5. However, in most cases the movement caused by the difference between Standard and assembly temperature is inconsiderable enough to remain within the bearing movement reserve.

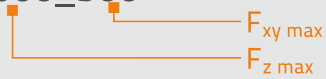
Corrosion protection of bearings meets the requirements of Standard EN 1337-9 and is adjusted to their working conditions, including aggressive maritime environment (corrosion resistance class C5-M).



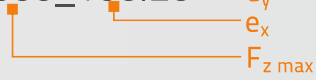
Bearings made by B2 are produced in the Polish production plants. We cooperate with the Polish suppliers of steel, elastomer and other elements of bearings. The entire production cycle is subject to Factory Production Control, which guarantees top quality of bearings.

## Designation

FX 5000\_500



GL 5000\_100.20

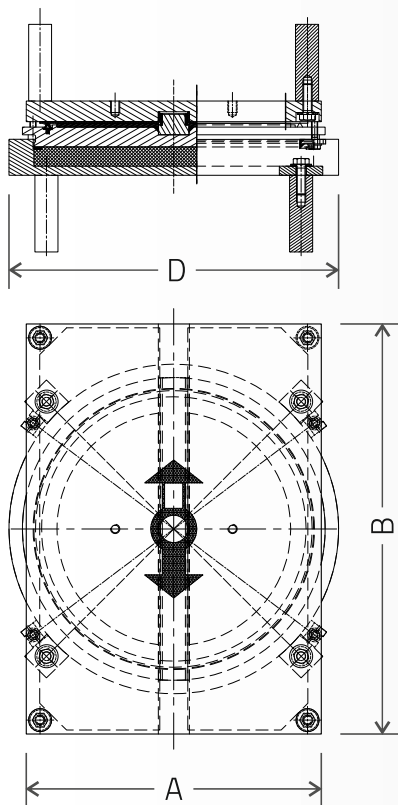


GG 5000\_500\_50

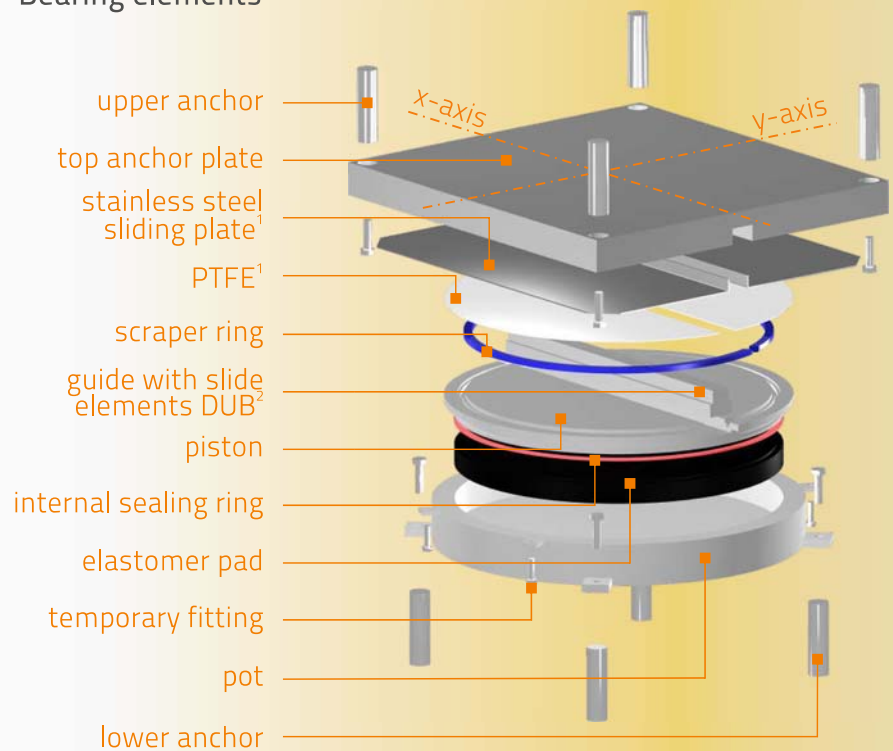


## Data required to design bearings according to EN 1337

Mark	Unit	Parameter
$F_{z \max}$	kN	maximum vertical load (ULS)
$F_{z \min}$	kN	minimal vertical load (ULS)
$F_{xy \max}$	kN	maximum resultant horizontal load (ULS)
$F_{y \max}$	kN	maximum horizontal load along the y-axis of the bearing (ULS)
$e_x$	mm	total range of displacement along the x-axis of the bearing
$e_y$	mm	total range of displacement along the y-axis of the bearing
$\alpha$	rad	maximum angle of rotation of the bearing

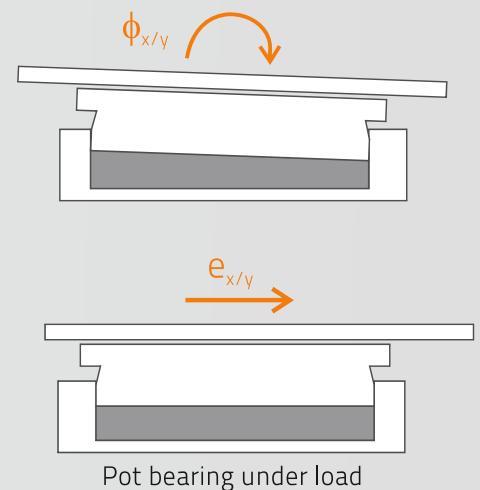


## Bearing elements



1. For free and guided sliding bearings only
2. For guided sliding bearings only

Element	Material	Standard
pot, piston, guide, sliding plate	S355 J0	EN 10025
elastomer pad	NR (Natural Rubber)	ISO 6446, ISO 37, ISO 188
PTFE	PTFE	ISO 1183, ISO 527-1, ISO-527-3, ISO 2039-1
stainless steel sliding plate	1.4401 + 2B	EN 10088-2
composite material for sliding surfaces	CM1	EN 1337-2
internal sealing ring	CuZn39Pb3	EN 12164
anchor bolts	class 10.9	ISO 898-1



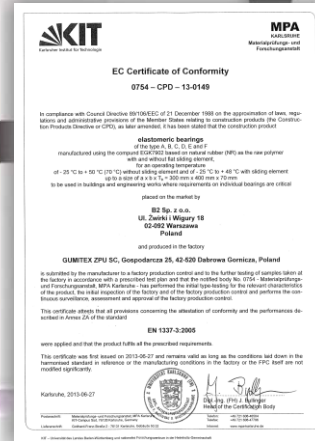
# elastomeric bearings

Elastomeric bearings can be applied both in structures and buildings. Their major advantage is the ease of assembly, high resistance to atmospheric conditions, as well as anti-vibration properties. Bearings have layering structure – steel metal sheets are connected with rubber with the use of vulcanization.

Movements and rotation of elastomeric bearings are possible thanks to deformation of elastomeric block. These bearings are characterized by the ability to carry big rotation angle (up to 0,034 rad). Maximum vertical load is 12 000 kN (ULS). Operating temperature is between -25 °C and 48 °C. Bearings that are the most frequently applied are elastomeric bearings on a rectangular shape, however B2 Sp. z o.o. offers bearings on a circular shape as well.



Elastomeric bearings offered by B2 Sp. z o.o. are made in the Polish production plants, according to the requirements of Standard EN 1337-3, which is acknowledged by Conformity Certificates No. 0754-CPD-13-0149 and ES029588.

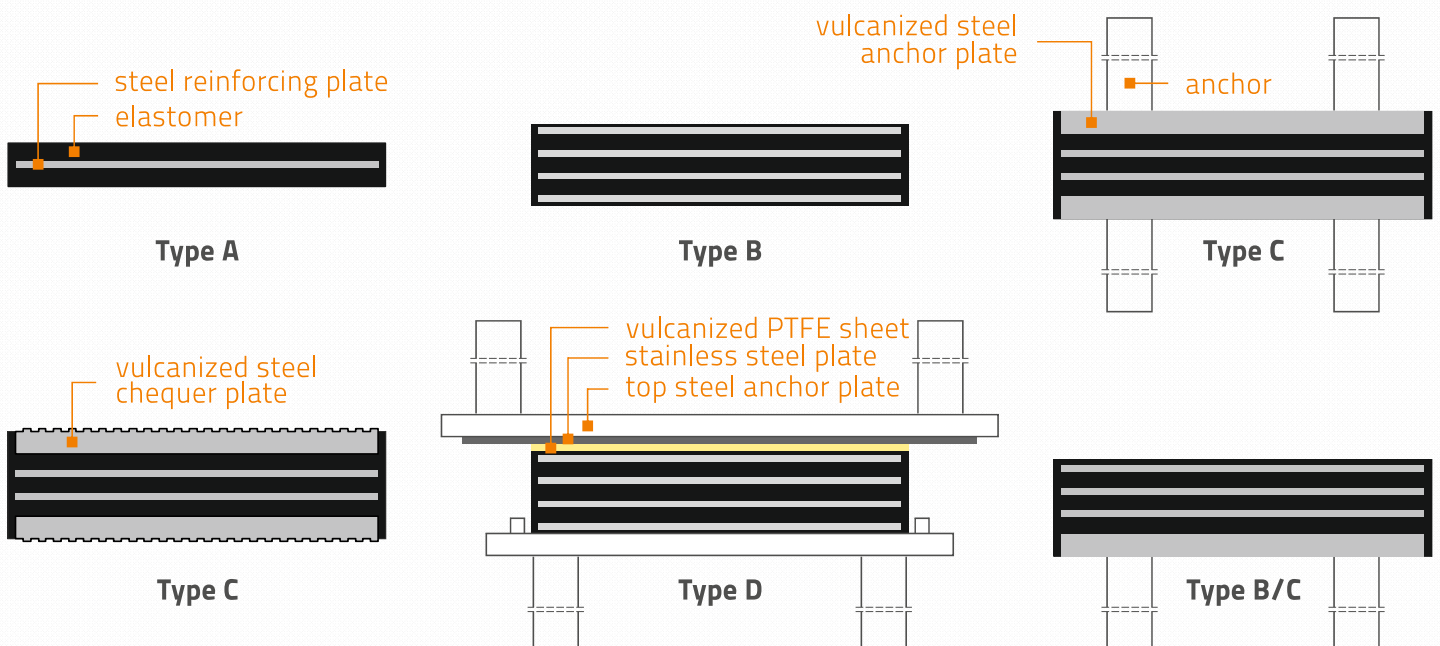


Guided sliding pot bearing and fixed bearings are supplied with upper and lower anchor plates and a proper guide. For the large movements (more than ±40 mm) elastomeric sliding bearing is additionally equipped with PTFE sheet and stainless steel (type D).

The most commonly applied cross sections of elastomeric bearings are as follows:

- A - bearing with one reinforcing plate, fully covered with elastomer
- B - bearing with at least two reinforcing plates, fully covered with elastomer
- C - bearing with at least two internal reinforcing plates and two external plates (vulcanized steel anchor plates or steel chequer plates)
- D - bearing with at least two reinforcing plates and vulcanized PTFE sheet (sliding elastomeric bearing)

Applying connected types: B/C, B/D and C/D is also allowed.





## Designation

V 300/400/41

dimensions of the elastomeric pad:  
width/length/height

bearing type

Type B is the most frequently applied and therefore, in case of lack of type symbol in the name of bearing, it is assumed that the bearing is the type B one.

## Data required to design bearings according to EN 1337

Mark	Unit	Parameter
$F_{z,max}$	kN	maximum vertical load (ULS)
$F_{z,min}$	kN	minimal vertical load (ULS)
$F_{x,max}$	kN	maximum horizontal load along the x-axis of the bearing (ULS)
$F_{y,max}$	kN	maximum horizontal load along the y-axis of the bearing (ULS)
$e_x$	mm	total range of displacement along the x-axis of the bearing
$e_y$	mm	total range of displacement along the y-axis of the bearing
$\alpha_x$	rad	maximum angle of rotation along the x-axis of the bearing
$\alpha_y$	rad	maximum angle of rotation along the y-axis of the bearing

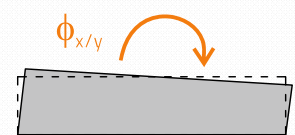
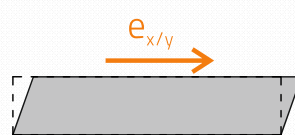
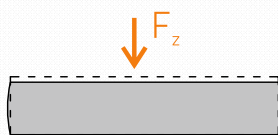
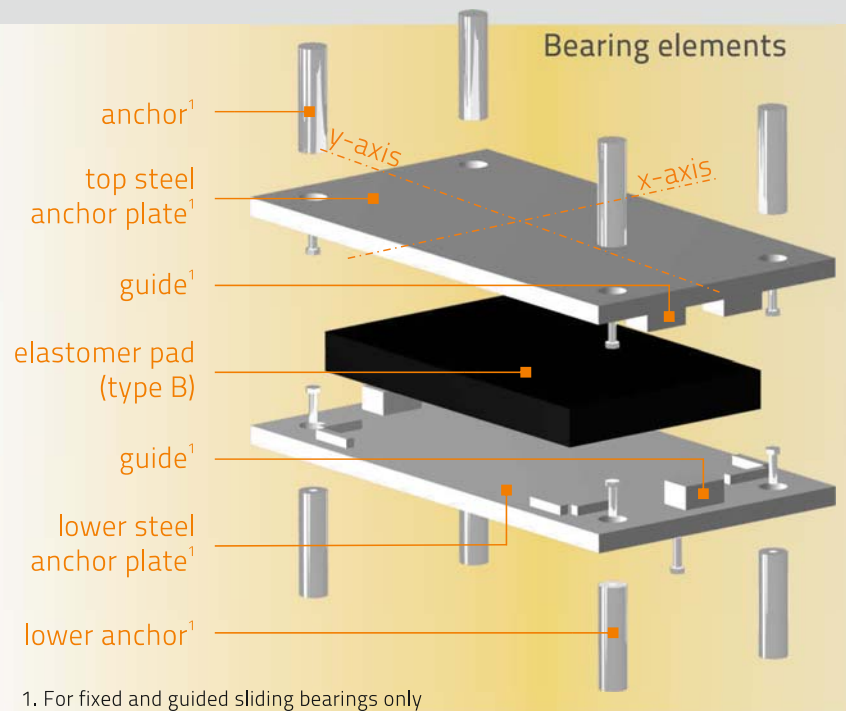
## Elastomeric bearings types description:

- fixed (**V**)
- longitudinally guided sliding (**V1L**)
- transversally guided sliding (**V1Q**)
- free sliding (**V2**)

## Sliding elastomeric bearings types description:

- longitudinally guided sliding (**VG1L**)
- free sliding (**VG2**)

Element	Material	Standard
guide, plates	S355 J0	EN 10025
reinforcing plate	S235 JR	EN 10025
elastomer pad	NR (Natural Rubber)	ISO 34-1, ISO-37, ISO 48, ISO 188, ISO 815, ISO 1431-1
anchor bolts	class 10,9	ISO 898-1



Elastomeric bearing under load



# spherical bearings

Spherical bearing consists of two backing plates: with a concave spherical surface (immovable) and with a convex spherical surface (movable). There is PTFE sheet between them as well as a stainless steel sheet that ensure the ease of bearing rotation. Movement is possible thanks to placing additional PTFE sheet and stainless steel plate as well as flat sliding plate on the upper movable surface of embedding plate.

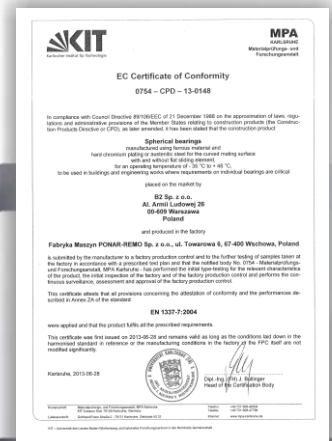
Disabling the bearing movement in one of the directions is done by the use of guides and sliding material. Total disabling of the horizontal movement is possible thanks to the restraining ring (fixed bearing).

B2 Sp. z o.o. offers the following types of spherical bearings:

- fixed (**LSS**)
- free sliding (**LSW**)
- guided sliding (**LSJ**)



Spherical bearings offered by B2 Sp. z o.o. are made in the Polish production plant, according to the Standard EN 1337-7, which is acknowledged by the Conformity Certificate No. 0754-CPD-13-0148 issued by Karlsruhe Institut für Technologie.



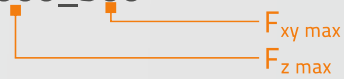
Minimal operation temperature for spherical bearings is  $-40\text{ }^{\circ}\text{C}$ . Thanks to their structure, they allow for high load-bearing capacity whilst still having small dimensions and long life cycle. The bearings are characterized by high abrasion and atmospheric conditions resistance.





## Designation

LSS 5000\_500



LSW 5000\_100.20

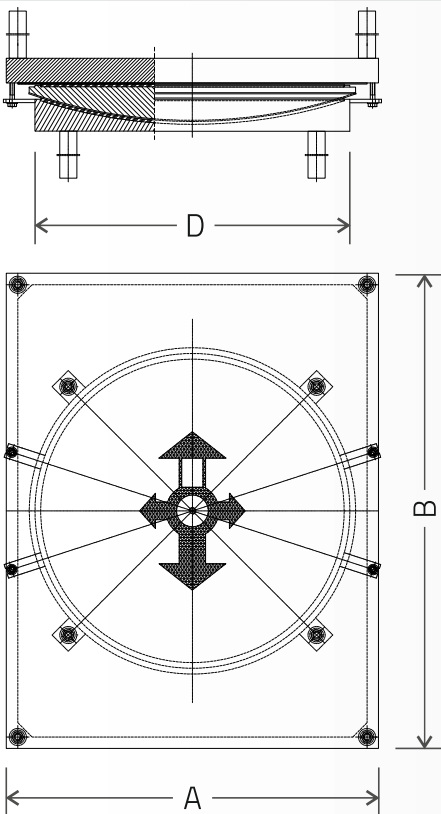


LSJ 5000\_500\_50

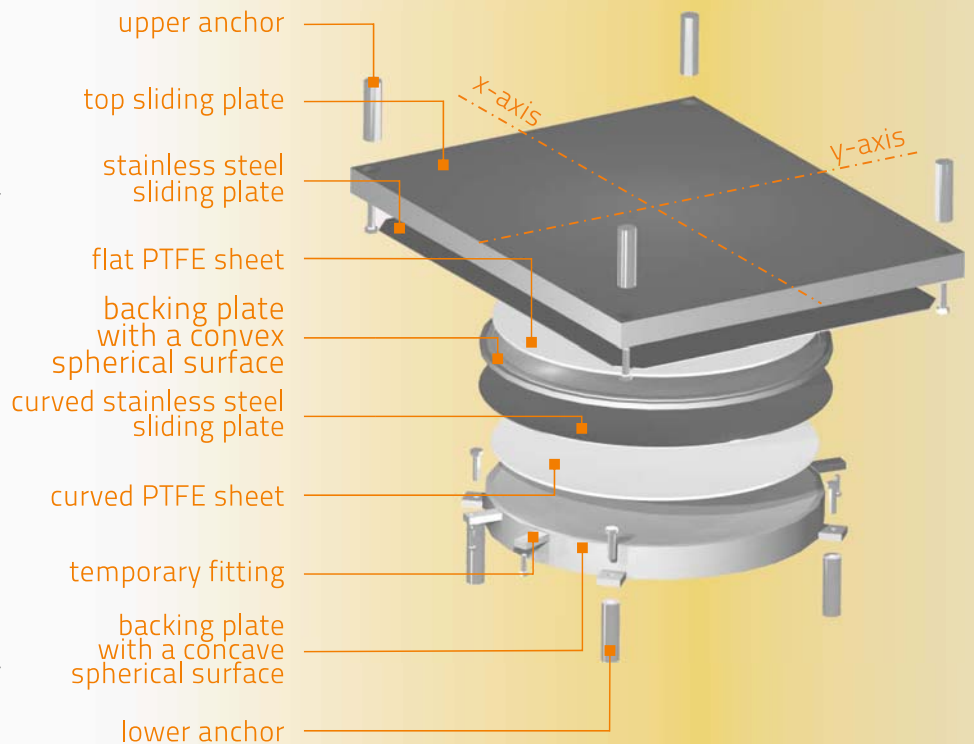


## Data required to design bearings according to EN 1337

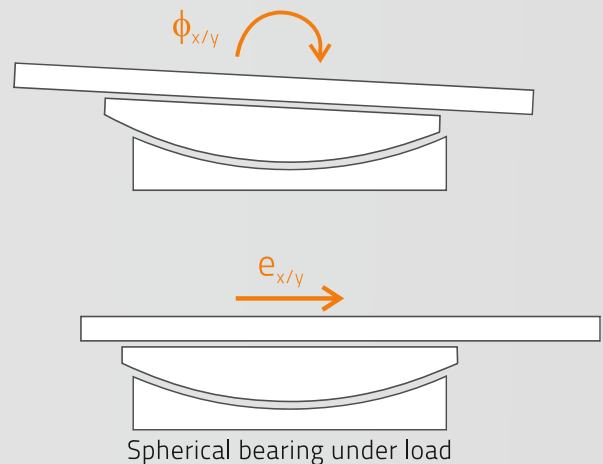
Mark	Unit	Parameter
$F_{z \max}$	kN	maximum vertical load (ULS)
$F_{z \min}$	kN	minimal vertical load (ULS)
$F_{xy \max}$	kN	maximum resultant horizontal load (ULS)
$F_{y \max}$	kN	maximum horizontal load along the y-axis of the bearing (ULS)
$e_x$	mm	total range of displacement along the x-axis of the bearing
$e_y$	mm	total range of displacement along the y-axis of the bearing
$\alpha$	rad	maximum angle of rotation of the bearing



## Bearing elements



Element	Material	Standard
backing plates, sliding plate	S355 J0	EN 10025
PTFE	PTFE	ISO 1183, ISO 527-1, ISO-527-3, ISO 2039-1
stainless steel sliding plates	1.4401 + 2B	EN 10088-2
anchor bolts	class 10.9	ISO 898-1



# modular expansion joints

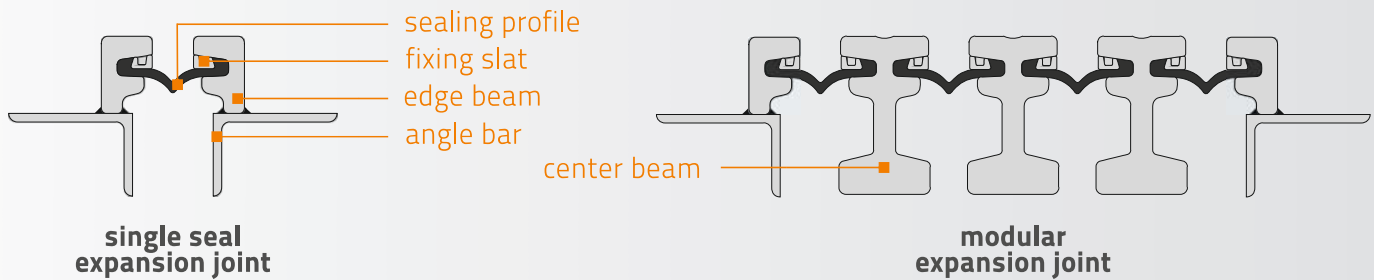
According to the number of sealing profiles, expansion joints can be divided into several types:

- single seal expansion joints consisting of two edge beams anchored in the span and abutment and one elastomeric sealing profile,
- modular expansion joints consisting of two edge beams anchored in the span and abutment, at least one center beam and at least two elastomeric sealing profiles.

B2 Sp. z o.o. offers modular expansion joints of three types: **B2W**, **B2NS** and **B2NN**.

## B2W

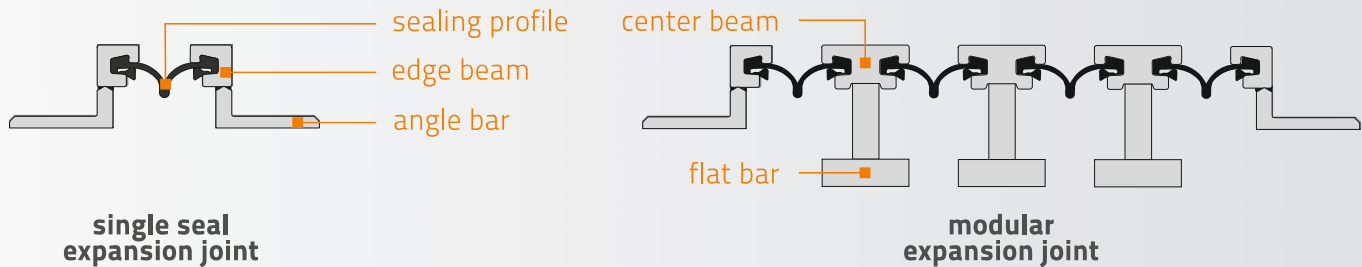
Made entirely of structural steel with sealing profile fixed with the use of a fixing slat.



## B2NS and B2NN

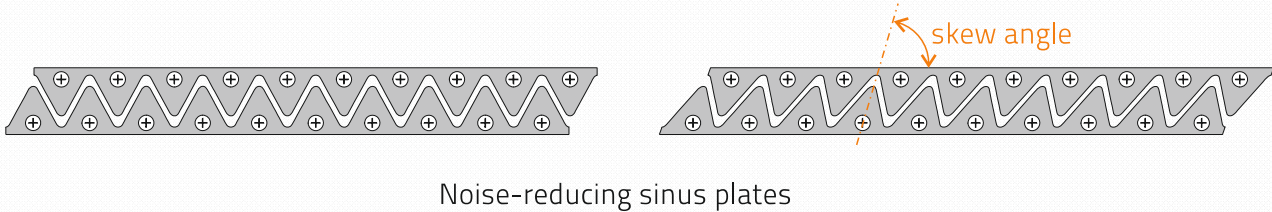
B2NS - made of structural or stainless steel with self-wedging sealing profile.

B2NN - made partly of structural steel and partly of stainless steel (hybrid profile), with self-wedging sealing



Type	Technical Approval	Element	Material	Standard	Modular expansion joints system
B2W	AT/2010-02-2676/2	edge beams	S235 JR	EN 10025	<p>scissor mechanism</p>
		center beams	S355 J2		
		angle bars	S235 JR		
B2NS	AT/2013-02-3007 AT/2013-02-3013	edge beams	S355 J0 or W1.4301	EN 10025 EN 10088	<p>support box</p> <p>elastomer disc</p> <p>support bar with a sliding plates</p>
		center beams	S355 J0 or W1.4301		
		angle bars, flat bars	S355 J0 or W1.4301		
B2NN	AT/2013-02-3007 AT/2013-02-3013	edge beams	W1.4301	EN 10025 EN 10088	
		center beams	W1.4301		
		angle bars, flat bars	S355 J0		

For all the aforementioned types of expansion joints (B2W, B2NS i B2NN) two kinds of elastomeric sealing profiles can be used (movement range  $\pm 40$  mm and  $\pm 50$  mm for a single module). Expansion joints with movement module of  $\pm 50$  mm are equipped with steel noise-reducing sinus plates (**SL** symbol).



Expansion joints without sinus plates  
(movement range  $\pm 40$  mm  
for a single sealing profile)

Type	Number of gaps	Maxi. longitudinal movement [mm]
80/15	1	$\pm 40$
80/25	2	$\pm 80$
80/35	3	$\pm 120$
80/45	4	$\pm 160$
80/55	5	$\pm 200$
80/65	6	$\pm 240$
80/75	7	$\pm 280$
80/85	8	$\pm 320$
80/95	9	$\pm 360$

Expansion joints with sinus plates (SL)  
(movement range  $\pm 50$  mm  
for a single sealing profile)

Type	Number of gaps	Max. longitudinal movement [mm]
100SL/15	1	$\pm 50$
100SL/25	2	$\pm 100$
100SL/35	3	$\pm 150$
100SL/45	4	$\pm 200$
100SL/55	5	$\pm 250$
100SL/65	6	$\pm 300$
100SL/75	7	$\pm 350$
100SL/85	8	$\pm 400$
100SL/95	9	$\pm 450$

Expansion joint is fixed to the concrete structure with the use of steel anchors and bolts. In case of steel structure, the expansion joint can be welded or screwed on by the screws. Additional equipment of expansion joint may include aluminium or stainless cover plates for the comfort and safety of pedestrians.



1. B2NN 100SL/15    2. B2NN 80SL/25    3. B2W 80/45    4. B2W 80/25    5. B2W 100SL/25    6. B2W 100SL/15

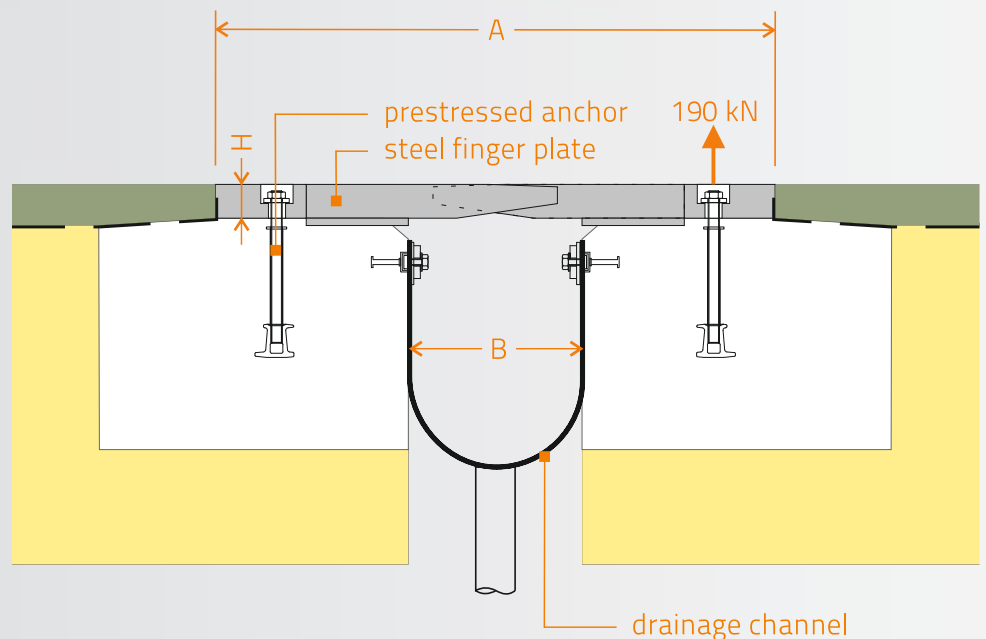
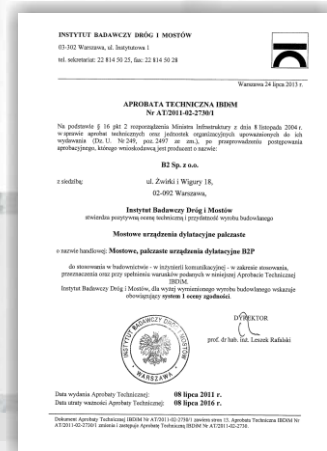


# finger expansion joints

**B2P** steel finger expansion joints are made of steel plates fixed on both sides of expansion gap. Each plate contains alternate finger supporting elements reaching the surface over the expansion gap, which enables vehicle wheels passage. Plates are made of steel S355 J2 and fixed to the structure with the use of prestressed anchors M22 by the force of 190 kN.

The elements of deck intended for pedestrian and cycle traffic are covered by the cover plates of appropriate width. Tightness of expansion joint creates drainage channel made of EPDM foil that collects rain water and drain it to the sewage system.

Steel finger expansion joints, according to Technical Approval No. AT/2011-02-2730/1 issued by Road and Bridge Research Institute in Warsaw, are offered for the range of movements between  $\pm 90$  mm to  $\pm 400$  mm.

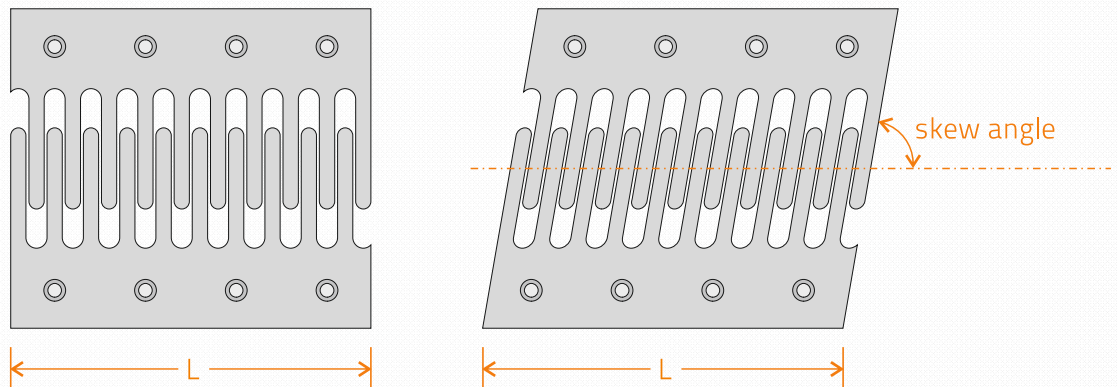


Element	Material	Standard
steel plates	S355 J2	EN 10025
drainage channel	elastomer	ISO 37, ISO 188, ISO 868
anchor bolts	class 10,9	ISO 898-1

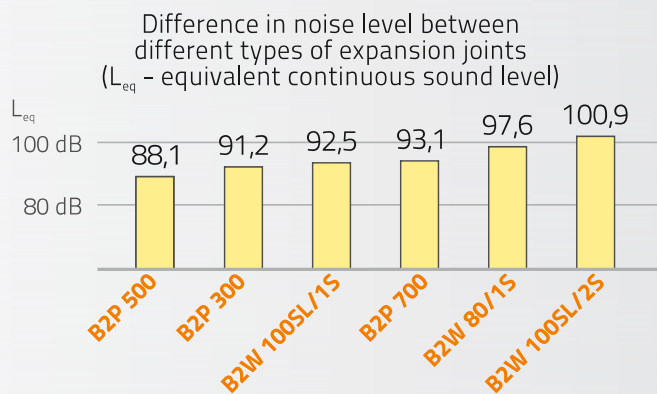
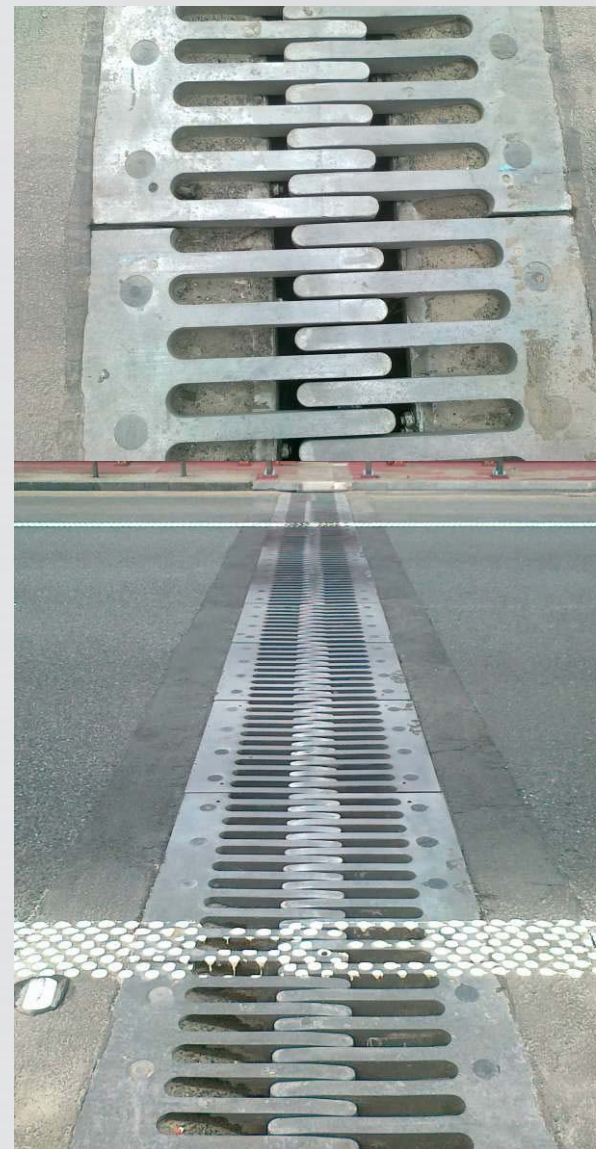
The steel plates are treated with corrosion protection systems based on ISO 12944, ISO 2063 or ISO 1461.

# finger expansion joints

The greatest advantages of B2P finger expansion joints are: simple structure, easy transport, quick assembly and possible exchange, silent passage of vehicles and the possibility of assembling expansion joint of any length.



Type	Max. longitudinal movement [mm]	A [mm]		B [mm]		H [mm]	L [mm]
		min.	max.	min.	max.		
B2P 180	±90	430	610	50	230	50	992
B2P 200	±100	430	430	50	250	50	992
B2P 250	±125	510	760	50	300	50	992
B2P 300	±150	590	890	50	350	50	992
B2P 350	±175	650	1000	50	400	60	992
B2P 400	±200	740	1140	50	450	65	992
B2P 450	±225	810	1260	50	500	65	992
B2P 500	±250	890	1390	50	550	70	992
B2P 550	±275	960	1510	50	600	75	992
B2P 600	±300	1020	1620	50	650	80	992
B2P 650	±325	1090	1740	50	700	90	992
B2P 700	±350	1160	1860	50	750	100	992
B2P 750	±375	1230	1980	50	800	110	992
B2P 800	±400	1310	2110	50	850	120	992







Selected investments where B2 Sp. z o.o. acted as a subcontractor or a provider:

### Highways

1. A1 Pyrzowice – Piekary Śląskie
2. A1 Toruń – Stryków (part I: Czerniewice – Odolion, PZ-153a bridge)
3. A2 Stryków – Konotopa (part B, E)
4. A4 Tarnów – Rzeszów (Rzeszów Centralny – Rzeszów Wschód)
5. A4 Tarnów („Krzyż” junction) – Rzeszów („Rzeszów Zachodni” junction) (part I)
6. A4 Szarów – Krzyż (part B: Brzesko – Wierzchosławice)

### Expressways and trunk roads

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. S3 Międzyrzecz – Gorzów Wielkopolski (part 1, 2, 3)</li> <li>2. S7 Kielce – Chęciny</li> <li>3. S7 Pasłęk – Miłomłyn</li> <li>4. S7 Gdańsk South Ring Road</li> <li>5. S8 Wrocław – Syców (part 1: Wrocław – Oleśnica)</li> <li>6. S8 Syców – Wieruszów (part I i II)</li> <li>7. S8 Walichnowy – Łódź (A1) (part 1, 2, 3, 5, 6, 7, 8, 9)</li> <li>8. S8 Grot-Rowecki Bridge across the Vistula in Warsaw</li> <li>9. S11 Poznań West Ring Road</li> <li>10. S12/S17/S19 Lublin Ring Road</li> <li>11. S17 Kurów – Piaski (part 1, 2, 2a, 3)</li> <li>12. S61 Stawiski Ring Road</li> </ol> | <ol style="list-style-type: none"> <li>13. S61 Augustów Ring Road</li> <li>14. DK1/DK46 in Częstochowa</li> <li>15. DK8 Jeżewo – Białystok</li> <li>16. DK8 Piotrków Trybunalski – Rawa Mazowiecka</li> <li>17. DK8 Augustów Ring Road</li> <li>18. DK12 Piotrków Trybunalski – Sulejów</li> <li>19. DK19 Smorawiński Street in Lublin</li> <li>20. DK39 Krakus Bridge in Brzeg</li> <li>21. DK61 Bargłów Kościelny Ring Road</li> <li>22. DK74 Hrubieszów Ring Road</li> <li>23. DK77 Leżajsk Ring Road (part 2)</li> <li>24. DK79 Katowicka Street in Chorzów</li> </ol> |
|---|--|

### Ring roads, other roads and bridges

1. Radom South Ring Road (part II)
2. Murowana Goślina Ring Road
3. Modernization of railway line E 65 Warsaw – Gdynia: LCS Hława
4. Modernization of railway line E 65 Warsaw – Gdynia: LCS Działdowo
5. Modernization of railway line E 65 Warsaw – Gdynia: LCS Nasielsk
6. Viaducts over railway line E 65 Grodzisk Maz. – Zawiercie (CMK)
7. Ogiński Street in Bydgoszcz
8. Nowolazurowa Street in Warsaw
9. Diametral Highway from “Grudziądz” junction (A1 highway) to DK55
10. Diametral Highway in Silesian Voivodeship (part G2-G4 in Gliwice)
11. Anders Street in Białystok
12. Kleeberg Street in Białystok
13. Bridge across Biała River in Białystok
14. Briański Viaduct in Konin
15. “Słupca” junction conversion on A2 highway
16. Bridge across Vistula in Połaniec
17. Chwarznieńska Street in Gdynia (part III)

### Repairs and reconstructions

#### (replacement/rectification of bearings, repair/replacement of expansion joints, moving and lifting bridge structures)

18. Wrocław Highway Ring Road: MA-8 bridge
19. S8 Wrocław – Syców (part from „Pawłowice” junction to „Dąbrowa” junction): WN-20 bridge
20. Kwiatkowski Street in Gdynia
21. Viaducts over DK41 trunk road in Nysa
22. Viaducts over DK42 trunk road in Kluczbork
23. Bridge across Skawinka River in Skawina
24. Bridge over Nowohucka Street across Vistula in Kraków

