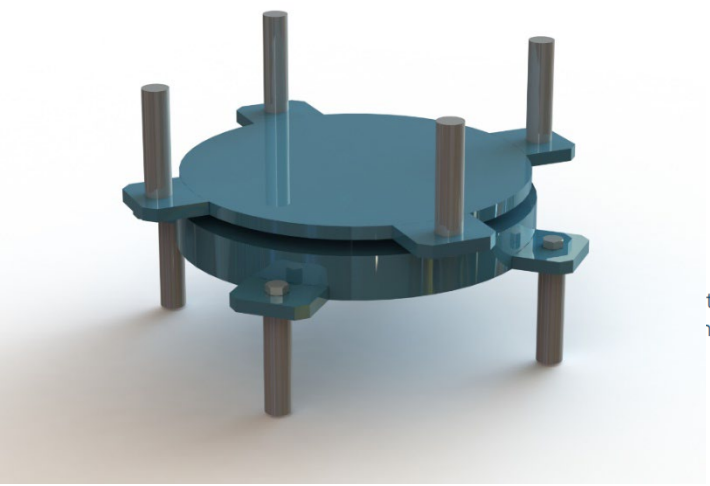
HIPOT

POT BEARINGS



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HIPOT BEARINGS

COMPANY INTRODUCTION

Hirun International Ltd. (HIRUN) is a professional manufacturing enterprise of research, development, production and sales in bridge and anti- seismic products with over 50 years experience in the field
Its headquarters are located
in Taichung, Taiwan
Subsidiary production facilities, marketing operation and technical offices are located in Changhua, Taiwan and Milano, Italy.

HIPOT POT BEARINGS:

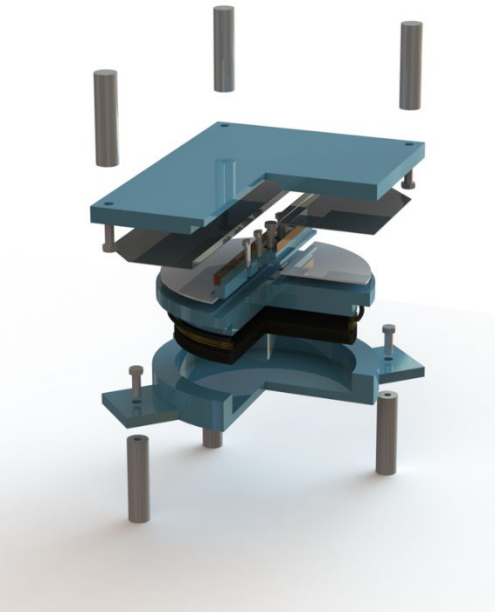
- **GENERAL**

HIPOT bearings are structural devices allowing relative rotations around 3 axes between two members of a structure, may transmit the loads in any direction preventing any displacement (Fixed Bearing HIPOT FP), or allowing displacement in one direction only (Guided Bearing HIPOT GP), or in all directions of a plane (Free Sliding Bearing HIPOT SP).
HIPOT bearings can be utilized in bridges, buildings and any kind of structure of civil engineering, including railway bridges and structures located in seismic areas.
HIPOT bearings are suitable for minimum temperatures of -40°C (type FP) or -35°C (and types GP, SP) and maximum temperatures of +50°C
The extrusion of the elastomeric pad is prevented by a brass seal that can grant a total accumulated slide path due to rotation grater than 1000 m
HIPOT bearings are designed and manufactured according to EN 1337.5 and EN 1337.2 but on demand they can be manufactured in accordance with any other standard.
HIPOT bearings can grant a life span over 100 years with a very limited maintenance program

- **FUNCTION AND STANDARD APPLICATION**

Main function and standard applications where the using of HIPOT is suggested:

- are suitable to transmit vertical loads from zero to 100.000 kN and more
- can transmit high horizontal loads even in absence of a vertical load
- can allow rotations around 3 axes with very limited restraint moment
- can allow movements in one or two directions with very low friction and without any limitation.
- can resist dynamic loads and are resistant to fatigue effects.



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Main special application:

- can be provided with anti-lift system in order to resist negative loads
- can be provided with an injection system in order to compensate foundation settlements
- can be provided with load cell and displacement transducers
- can be combined with Shock Transmission Unit or Hysteretic devices for special applications in seismic areas

OPTIONAL ITEMS

The following items may be added to the bearings if requested:

- A protection seal to protect the PTFE sheet
- A rubber dust proofing skirt
- A displacement indicator
- A wedge plate to adapt inclined beams
- A monitor system to record loads and displacement
- An injection system to compensate foundation settlements
- A temporary sliding device to allow incremental launching of the bridges

CORROSION PROTECTION

The corrosion protection of structural steel is normally performed in accordance with EN ISO 12944.
The working life of the protective coating system on the bearing can be assumed to be fulfilled with a protective system designed for the durability "VH" of more than 25 years in accordance with EN ISO 12944-5:2019, for very high corrosivity atmospheric environmental conditions category C5 as classified by EN ISO 12944-2:2017, table 1.
Surfaces in contact with concrete need no corrosion protection, however a layer of 50 µm of the first pack is applied in order to prevent oxidation during the storage before the installation. A return of at least 50 mm is applied.
In alternative paint will conform to the Project specifications, as specified by the purchaser.
As option the corrosion protection may be performed by zinc or aluminum metal spray in accordance with ISO 12944 extending the time to first maintenance or for extreme environmental conditions.

STANDARD

Normally HIPOT bearings are designed, manufactured and tested in accordance with EN 1337.5; according to specific request they can be CE marked
On demand HIPOT bearings can be designed and manufactured in accordance with any other standard as:

- BS 5400
- AASHTO
- Others

- **QUALITY ASSURANCE**

The whole production of HIRUN is subjected to a quality assurance program in accordance with ISO 9000 certified by CQC, member of the International Mutual Acknowledgment Body IQNET.
In addition the production of the bearings is subjected to a specific quality assurance program in accordance with EN 1337.5 and 1337.2 Annex ZA for the CE marking with the supervision of a Notified Body

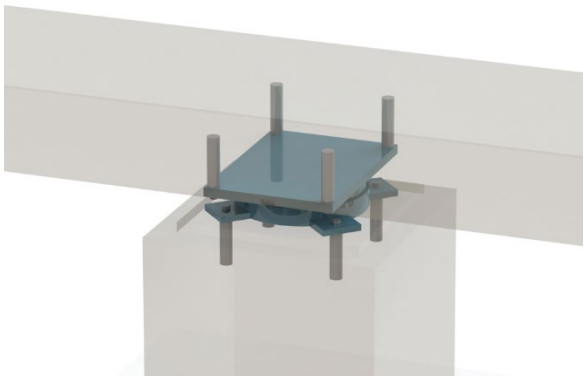
- **TESTS**

The tests are performed in accordance to the specific requirement of the project and may include:

- Vertical load tests
- Horizontal load test
- Friction tests
- Wear of the sliding material tests
- Rotation tests

- **INSTALLATION**

The installation shall always be carried out by qualified and trained personnel, eventually with the co-operation of HIRUN specialists.
HIRUN will provide installation manual conforming to EN 1337.11 or dedicated manuals for particular jobs
In the following schemes is shown one of the most common procedures for cast in situ structures

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Casting the pier with void formers in the position of the anchors</td><td>Placing the bearing and installing the mold for injecting the concrete.</td></tr>
<tr><td>  </td><td rowspan="2">  </td></tr>
<tr><td>Grouting the mortar</td></tr>
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- **HIPOT WITH HI-3 SLIDING MATERIAL**

HIPOT BEARINGS

HI-3 is an outstanding sliding material developed by Hirun International
The main technical properties are the following:

- Density, typical value 2.6 g/cm3 with tolerance 20% in accordance with ASTM D 792
- Tensile strength ≥ 16 MPa in accordance with ISO 527
- Elongation at break ≥ 220 % in accordance with ISO 527
- Surface hardness ≥ 65 shore D in accordance with ASTM D 2240
- Compressive strength ≥ 180 MPa
- Service temperature -50 + 120°C
- Wear resistance ≥ 50 km

The HI-3 sliding material is tested to verify the Cold Flow at high temperature,

The main advantages provided by the bearings with special sliding material HI-3:

- The useful life of the bearings is extended by a factor at least 5. It is well known that for bridges subjected to heavy traffic the sliding material will continuously slide and will be worn out after a certain period. HI-3 has a resistance to wear at least 5 times greater than PTFE
- The field of temperature of the bearings is extended up to + 120°C and more –

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- **DIMENSIONS TABLE: HIPOT FP**

They are identified by the following Mark:
FP Vk (kN)-Hk (kN)

For instance FP 20000-4000 means: Fixed Pot Bearing with 20000 kN Characteristic vertical load and 40000 kN design horizontal load

Vk	Vd	Hd	A	HT
kN	kN	kN	mm	mm
1000	1400	200	250	52
2000	2800	400	360	67
3000	4200	600	430	78
4000	5600	800	490	82
5000	7000	1000	540	90
6000	8400	1200	590	95
7000	9800	1400	620	95
8000	11299	1600	670	110
9000	12600	1800	700	110
10000	14000	2000	730	110
11000	15400	2200	770	115
12000	16800	2400	800	122
13000	18200	2600	830	125
15000	21000	3000	900	132
17500	24500	3500	970	145
20000	28000	4000	1030	160
25000	35000	5000	1150	200
30000	42000	6000	1260	240
40000	56000	8000	1460	280
50000	70000	10000	1630	320
60000	84000	12000	1790	360

Vk = Characteristic vertical load (SLS)
Vd = Design vertical load (ULS)
Hd = Design horizontal load
A = Bottom and upper plate dimension
HT = Total height

- **DIMENSIONS TABLE: HIPOT SP**

They are identified by the following Mark:
SP Vk (kN)/X (mm)/Y(mm)

For instance SP 20000/400/100 means: Free Sliding Pot Bearing with 20000 kN Characteristic vertical load, 400 mm longitudinal displacement (±200 mm) and 100 mm transversal displacement (±50 mm)

Vk	Vd	Y	X	A	B	C	HT
kN	kN	mm	mm	mm	mm	mm	mm
1000	1400	50	100	250	300	350	75
2000	2800	50	100	360	410	460	97
3000	4200	50	100	430	480	530	112
4000	5600	50	100	490	540	590	119
5000	7000	50	100	540	590	640	130
6000	8400	50	100	590	640	690	138
7000	9800	50	100	620	670	720	139
8000	11299	50	100	670	720	770	157
9000	12600	50	100	700	750	800	159
10000	14000	50	100	730	780	830	161
11000	15400	50	100	770	820	870	168
12000	16800	50	100	800	850	900	177
13000	18200	50	100	830	880	930	181
15000	21000	50	100	900	950	1000	192
17500	24500	50	100	970	1020	1070	209
20000	28000	50	100	1030	1080	1130	228
25000	35000	50	100	1150	1200	1250	274
30000	42000	50	100	1260	1310	1360	321
40000	56000	50	100	1460	1510	1560	372
50000	70000	50	100	1630	1680	1730	421
60000	84000	50	100	1790	1840	1890	471

Vk = Characteristic vertical load (SLS)
Vd = Design vertical load (ULS)
X = Longitudinal displacement
Y = Transversal displacement
A =Bottom plate dimension
B, C = Top plate dimensions
HT = Total height

- **DIMENSIONS TABLE: HIPOT GP**

They are identified by the following Mark:
GP Vk (kN)/X (mm)-Hd(kN)

For instance GP 20000/400-3000 means: Sliding Guided Pot Bearing with 20000 kN Characteristic vertical load, 400 mm longitudinal displacement (±200 mm) and 3000 kN transversal design load

Vk	Vd	Hd	X	A	B	C	HT
kN	kN	kN	mm	mm	mm	mm	mm
1000	1400	150	100	250	250	350	75
2000	2800	300	100	360	360	460	97
3000	4200	450	100	430	430	530	112
4000	5600	600	100	490	490	590	119
5000	7000	750	100	540	540	640	130
6000	8400	900	100	590	590	690	138
7000	9800	1050	100	620	620	720	139
8000	11299	1200	100	670	670	770	157
9000	12600	1350	100	700	700	800	159
10000	14000	1500	100	730	730	830	161
11000	15400	1650	100	770	770	870	168
12000	16800	1800	100	800	800	900	177
13000	18200	1950	100	830	830	930	181
15000	21000	2250	100	900	900	1000	192
17500	24500	2625	100	970	970	1070	209
20000	28000	3000	100	1030	1030	1130	228
25000	35000	3750	100	1150	1150	1250	274
30000	42000	4500	100	1260	1260	1360	321
40000	56000	6000	100	1460	1460	1560	372
50000	70000	7500	100	1630	1630	1730	421
60000	84000	9000	100	1790	1790	1890	471

Vk = Characteristic vertical load (SLS)
Vd = Design vertical load (ULS)
H_k = Characteristic horizontal load (SLS)
X = Longitudinal displacement
A =Bottom plate dimension
B, C = Top plate dimensions
HT = Total height