



SWIMMING POOL ISOLATION

Minimizing Structural Vibration
from Swimming Pools



Swimming pools at upper levels are luxury recreational facility in urban living. However, it can be annoyance to all occupants if the noise and vibration caused by pools activities are not properly isolated.

TOZEN SWIMMING POOL ISOLATION SYSTEMS

TOZEN swimming pool isolation systems isolates the building structure from the source of the vibration by sustaining the pool with high quality spring & rubber pad isolators. High efficiency is achieved with no solid contact between the pool and the building structure. Depends on the size of the pool and the purpose of use at beneath floors, rubber pads or spring isolators are required for moderate to high degree of isolation.

Isolators shall be placed underneath the pool structure according to the weight distribution and shape of the pool. Spring isolators are pre-compressed to facilitate the erection of the pool structure and its pipe work. Height variation of isolators are restrained between the pool is empty and filled with water to ensure pool structural integrity is maintained with the surrounding structure. Human access to the isolators is required for leveling and inspection. The access space shall invite sufficient air flow to prevent stagnant & corrosive environment under the pool. It is advised to include lateral buffers around the perimeter to limit lateral sway. Every structure is unique and therefore each scenario should be reviewed by specialist acoustic consultant to verify the system appropriation for the purpose.

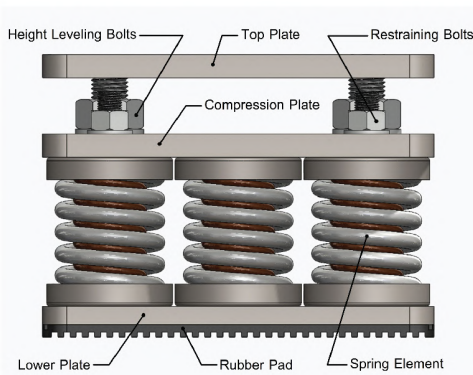
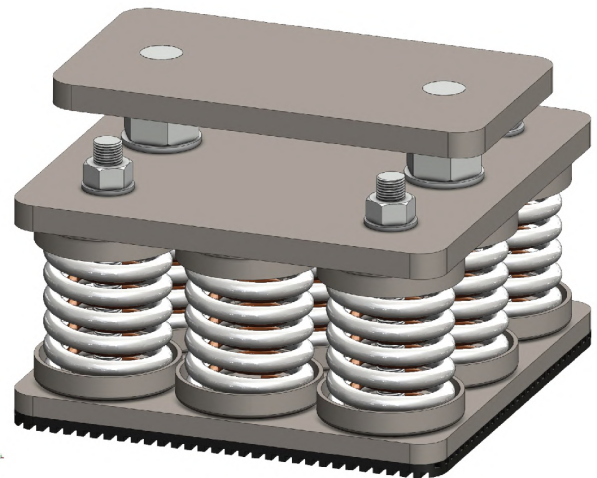
TOZEN PTM-PS SPRING ISOLATOR FOR SWIMMING POOL

APPLICATION

PTM-PS spring isolators are used to isolate noise & vibration caused from swimming pool activities, such as diving, etc. to maintain a pleasant environment. Pre-compressed spring elements control the height variation within 10mm between installation and operation.

FEATURES

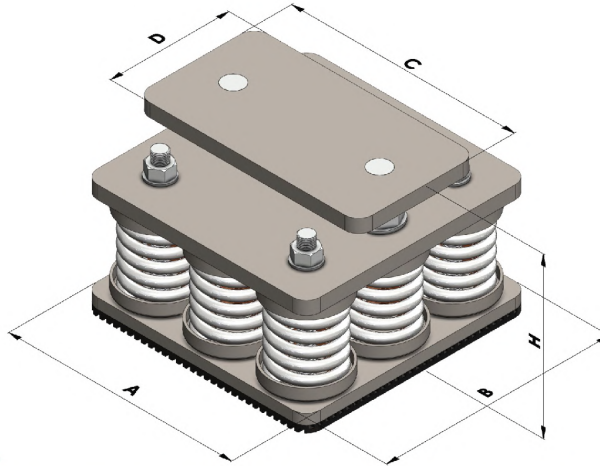
- Heavy duty lateral stable steel springs with color coded epoxy powder coating
- 40mm max. deflection with 30mm pre-compressed on delivery
- External leveling bolts and non-skid rubber pad bonded to base
- Loading range up to 13,440 kgs. Higher loading ranges are available upon request



PRODUCT DESCRIPTION

PTM-PS isolators are designed with spring horizontal to vertical stiffness ratios between 1 to 1.15 times at rated loads; dimension ratio of spring diameter to design loaded height not less than 0.8. Permitted extra travel not less than 50% of the design load. The base of PTM-PS isolator is bonded with acoustical isolating rubber pad to minimize the transmission of audible level frequencies.

PTM-PS type 40mm deflection single & multiply spring vibration isolator



Model	MIN Load @ Deflection 30 mm	MAX Load @ Deflection 40 mm	Spring Constant (Kg/mm)	Spring Color	Dimensions (mm)					"Height Leveling Bolt"	"Restraining Bolt"
	(Kgs)	(Kgs)			A	B	C	D	H*		
PTM-PS-281	210	280	7.0	Red	200	150	120	150	220	M24	M16
PTM-PS-421	315	420	10.5	Green							
PTM-PS-601	450	600	15.0	Gray							
PTM-PS-661	495	660	16.5	Green+Brown							
PTM-PS-841	630	840	21.0	Gray+Brown							
PTM-PS-562	420	560	14.0	Red	300	150	220	150	220	M24	M16
PTM-PS-1042	780	1040	26.0	Red+Brown							
PTM-PS-1202	900	1200	30.0	Gray							
PTM-PS-1322	990	1320	33.0	Green+Brown							
PTM-PS-1682	1260	1680	42.0	Gray+Brown							
PTM-PS-1124	840	1120	28.0	Red	250	250	250	165	220	M24	M16
PTM-PS-2084	1560	2080	52.0	Red+Brown							
PTM-PS-2404	1800	2400	60.0	Gray							
PTM-PS-2644	1980	2640	66.0	Green+Brown							
PTM-PS-3364	2520	3360	84.0	Gray+Brown							
PTM-PS-2526	1890	2520	63.0	Green	320	220	170	220	230	M30	M20
PTM-PS-3126	2340	3120	78.0	Red+Brown							
PTM-PS-3606	2700	3600	90.0	Gray							
PTM-PS-3966	2970	3960	99.0	Green+Brown							
PTM-PS-5046	3780	5040	126.0	Gray+Brown							
PTM-PS-3789	2835	3780	94.5	Green	320	320	320	170	230	M30	M20
PTM-PS-4689	3510	4680	117.0	Red+Brown							
PTM-PS-5949	4455	5940	148.5	Green+Brown							
PTM-PS-7569	5670	7560	189.0	Gray+Brown							
PTM-PS-62412	4680	6240	156.0	Red+Brown	420	320	420	160	240	M36	M24
PTM-PS-72012	5400	7200	180.0	Gray							
PTM-PS-79212	5940	7920	198.0	Green+Brown							
PTM-PS-100812	7560	10080	252.0	Gray+Brown							
PTM-PS-44816	3360	4480	112.0	Red	420	420	420	260	240	M36	M24
PTM-PS-67216	5040	6720	168.0	Green							
PTM-PS-83216	6240	8320	208.0	Red+Brown							
PTM-PS-96016	7200	9600	240.0	Gray							
PTM-PS-105616	7920	10560	264.0	Green+Brown							
PTM-PS-134416	10080	13440	336.0	Gray+Brown							

Note : - H* is pre-compressed height as supplied with 30 mm deflection on springs

ISOLATOR SELECTION AND LAYOUT

All PTM-PS are pre-compressed for easy handling and installation. It is essential to select a total capacity of all isolators is match with the load so to release the pre-compression of the isolators. The total weight of the swimming pool shell, water and integral structure shall be considered within 5% of accuracy to obtain the optimal efficiency.

WEATHER RESISTANCE

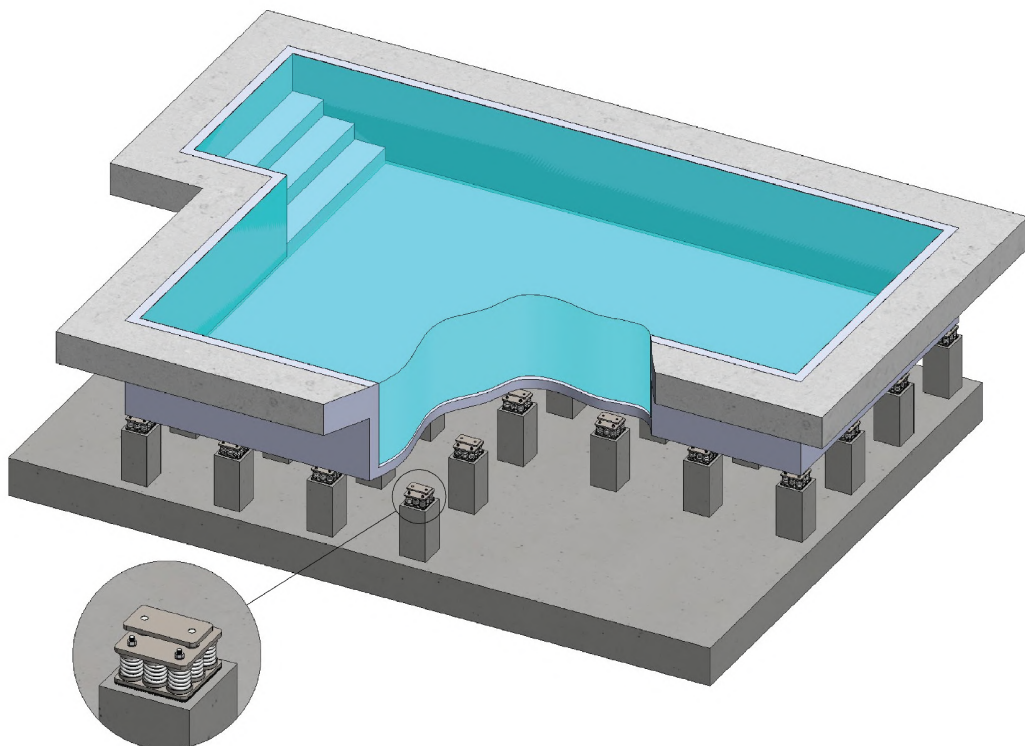
Steel structure of isolators are hot-dipped zinc galvanized while the spring elements are finished with epoxy powder coating. Isolators are not designed to be immersed in or regularly exposed to water which has leaked or overflowed from the pool. Ensure there is adequate drainage path in the cavity under the pool to prevent this from occurring.

INSTALLATION

Detailed layout drawing shall be provided by structure engineer showing spring layout and lateral restraint positions with detailed installation notes.

Below is a general guideline:

1. Install swimming pool buffer pads around surrounding perimeter walls.
2. Install closed cell EPDM foam around surrounding perimeter walls making a void cutout for buffer pads. Cover buffer pad with plastic and tape at the joins.
3. PTM-PS isolators are placed into position shown on detailed layout drawing and leveled with the external adjusting bolts.
4. Pool formwork is set level with the top plate of the isolators.
5. Normal pool construction follows.



RECTANGULAR RUBBER VIBRATION ISOLATOR

R series

HEAVY DUTY RUBBER ISOLATOR

BENEFIT

:Easy construction

Embedded Female screws makes an easy installation

:Compatible with heavy load

5 types are available 3t-10t

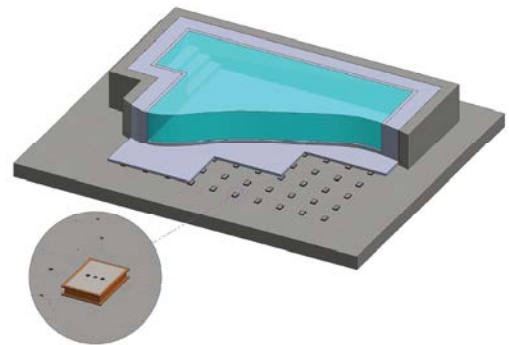
FEATURES

:Embedded female screw design insertion of Type_R rubber isolator in space in tight clearance

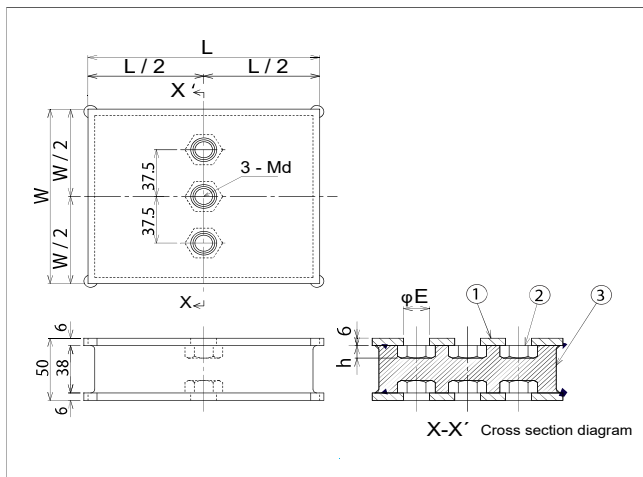
:3 fixing screw design is compatible with H-Beam or C-channel steel installation.

APPLICATION

Used as vibration isolation devise for large bore riser pipes for swing prevention / large mechanical equipment / 3D parking / swimming pool / machinery / steel structures, etc.



STRUCTURE AND DIMENSION



NO.	Name	Material
①	Metal fittings	SS400
②	Attachment nut	SS400
③	Rubber	Synthetic Rubber

Product Model Number	Dimension (mm)				
	W	L	Md	φE	h
R1414	140	140	M12	15	7
R1417	140	170	M16	19	10
R1421	140	210	M16	19	10
R1625	160	250	M16	19	10
R2028	200	280	M16	19	10

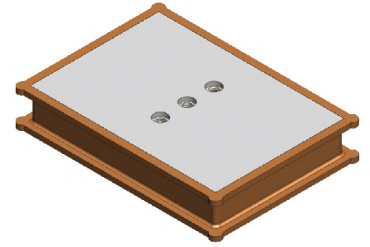
HANDING INSTRUCTION

The product has to be protected from any damage.

- Please note that the product must be avoided adhesion such as strong acid, strong alkali, organic solvent, fat and oil.
- The device needs to be attached as equalized loading toward the compression direction.
- Please use within the allowable load range.
- The product must be protected from spark like welding.

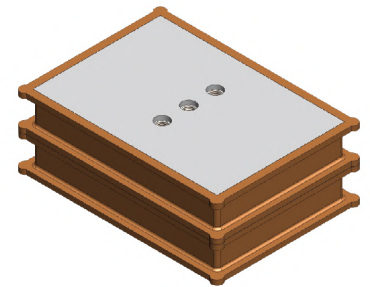
Single Layer

Model	Static Spring Constant		Allowable Load		Mass (kg)	Deflection (mm)
	N/mm	kgf/mm	N	kgf		
R1414	4864	496	29420	3000	2.7	6
R1417	6590	672	39227	4000	3.3	6
R1421	8875	905	49033	5000	4.0	5.5
R1625	12925	1318	68647	7000	4.4	5
R2028	20388	2079	98067	10000	7.6	5



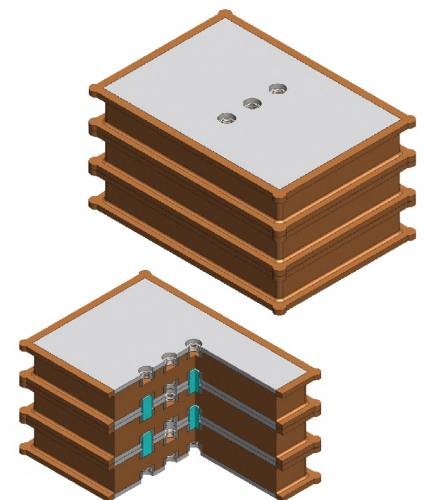
Double Layers

Model	Static Spring Constant		Allowable Load		Mass (kg)	Deflection (mm)
	N/mm	kgf/mm	N	kgf		
R1414-2	2432	248	29420	3000	5.4	12
R1417-2	3295	336	39227	4000	6.6	12
R1421-2	4438	453	49033	5000	8.0	11
R1625-2	6463	659	68647	7000	8.8	10
R2028-2	10194	1040	98067	10000	15.2	10



Triple Layers

Model	Static Spring Constant		Allowable load		Mass (kg)	Deflection (mm)
	N/mm	kgf/mm	N	kgf		
R1414-3	1621	165	29420	3000	8.1	18
R1417-3	2197	224	39227	4000	9.9	18
R1421-3	2958	302	49033	5000	12.0	16.5
R1625-3	4308	439	68647	7000	13.2	15
R2028-3	6796	693	98067	10000	22.8	15



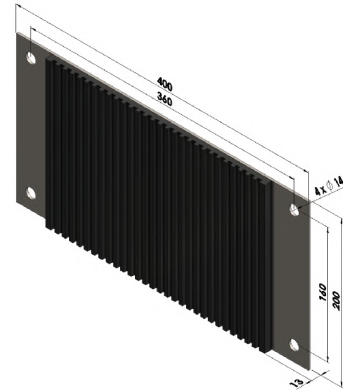
- : Dynamic spring constant of vibration control rubber is 1.3 times higher than that of a static one.
- : Please note that attachment bolt needs to be consider in locking the nut.
- : The metal component is covered by electrolytic zinc-coated.

SWIMMING POOL BUFFER PAD AND LATERAL RESTRAINT BLOCK

35kN load at 2mm Deflection

APPLICATION

Used as part of a complete swimming pool isolation system, Tozen swimming pool lateral restraints offer horizontal resilient support for the pool. The buffer pad and lateral restraint blocks do not provide additional isolation efficiency but are for seismic or wind-load restraint.

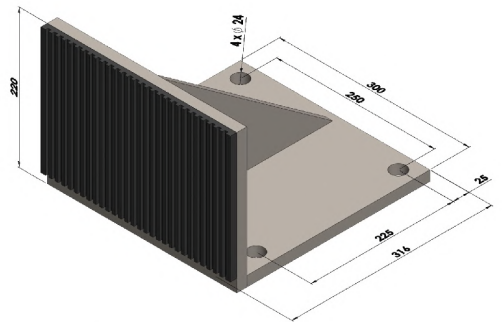


PRODUCT DESCRIPTION

Tozen swimming pool buffer pads are constructed from a layer of high-quality grooved elastomeric pad bonded to a corrosion resistant surface. The swimming pool buffer pad requires a surrounding perimeter wall to the pool shell or a structural hob to be fixed to. The lateral restraint block can be incorporated for applications where no vertical surface is available for bracing the swimming pool.

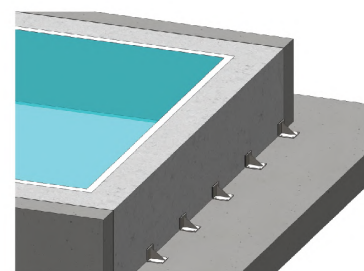
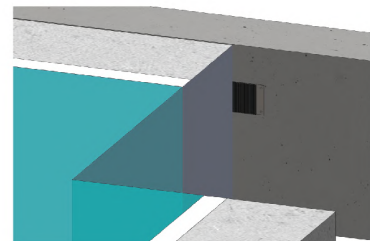
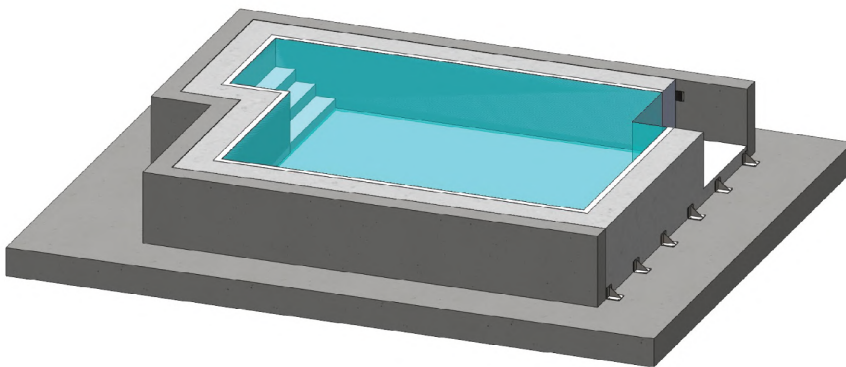
STRUCTURE

10mm ribbed anti-vibration elastomeric pads bonded to base plate made from stainless steel or galvanized steel for corrosion resistance. This provides effective corrosion resistance for harsh swimming pool environment. Higher capacity pads and lateral restraint blocks can be made to order.



INSTALLATION

The lateral load that needs to be restrained is normally 15% of total weight of the pool but must be confirmed by the project's structural engineers for earthquake code requirements, if any. For swimming pool buffer pads, installation is dependent on whether the restraining structure or the pool is poured first. The buffer pad is attached to either the pool or the structure within the perimeter isolation joint. For concrete decks, install flexible Joints. For the lateral restraint block, installation is carried out after formwork for the pool walls has been stripped.





TOZEN INDUSTRIAL CO., LTD.

3388/62 18TH FLOOR, SIRINRAT BLDG.,
RAMA IV RD., BANGKOK 10110 THAILAND
TEL : (66) 0-2029-0100
FAX : (66) 0-2029-0111
URL : www.tozen.co.th

TOZEN CORPORATION

8-4, ASAHY YOSHIKAWA
SAITAMA 342-008 JAPAN
TEL : 048-993-1030
FAX : 048-993-1038