PDS

ISOSISM® Technical data sheet reference no.: FT En C V 5 2 2

General description

The ISOSISM® PDS (Prestressed Damping Spring) combines the benefits of a viscous fluid damper and a prestressed hydraulic spring. In normal operating conditions, the ISOSISM® PDS acts as a fixed point.
During an earthquake, it dissipates energy and then returns the structure to its initial position.

ISOSISM® PDS

Applications

The prestressing force F_0 of the ISOSISM® PDS must be greater than the forces to be opposed in operation, such as thermal expansion, braking, wind, etc. It must be less than the seismic forces.

The ISOSISM® PDS offers a number of benefits:
- Three major functions combined in a single device;
- Highly reliable: The device is only placed under stress in the event of an earthquake;
- Compact design;
- Highly efficient;
- Zero maintenance.

PDS devices are in particular widely used to form the longitudinal fixed point of bridge decks.

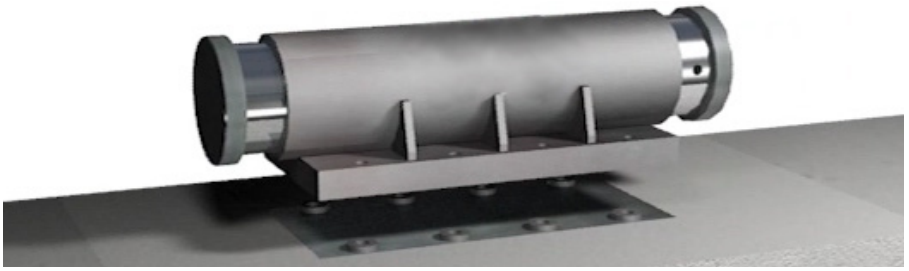
Main properties

- Opposes displacement in normal operating conditions.
- Dissipates energy during an earthquake.
- Recentres the structure after an earthquake.

Bridge - Mardakan

Design

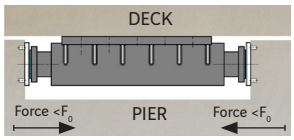
The ISOSISM® PDS can be installed along the longitudinal or transverse axis of the deck. Its ends are equipped with a sliding material to accommodate the thermal expansion of the structure.
It complies with EN 15129 and can be supplied with CE marking to this effect.



The standard protection applied to metal parts exposed to external attack is an approved, ACQPA-certified paint system designed to protect visible and non-visible parts of structures located in environments in which corrosion might develop rapidly, in accordance with NF ISO 12944-2.
Any other approved protection system can be applied on request.

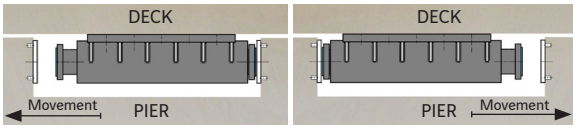
Behaviour

Operation is based on two behaviours:



Static behaviour

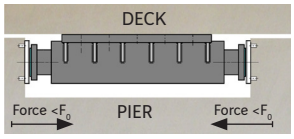
Below the prestressing force F_0, the structure is restrained by the ISOSISM® PDS, which acts as a stop (braking, wind, centrifugal force).



Ground movement during the earthquake

Dynamic behaviour

Above the prestressing force F_0, the PDS acts as a damping spring and dissipates the seismic energy.



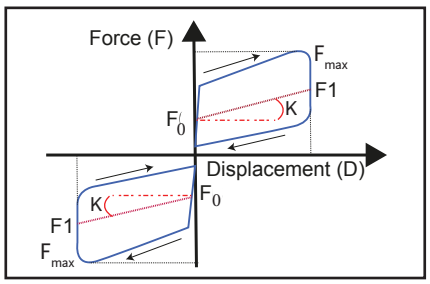
After an earthquake, the ISOSISM® PDS recentres the structure to its initial position.

Behaviour law

The behaviour law of the ISOSISM® PDS can be modeled as follows:

$$F=F_0+K.D+C.V^{\alpha} \qquad \alpha \leq 0.1$$

F: Force
F_0: Prestressing
K: Stiffness
D: Displacement
C: Damping constant
V: Velocity
α: Damping cœfficient



Graphic representation

Graphic representation of an ISOSISM® PDS

PDS

Tests

ISOSISM® PDSs have undergone numerous dynamic tests to guide and validate Freyssinet's technical development process.

ISOSISM® PDS during testing

CE marking

ISOSISM® PDS devices can be supplied with CE marking.

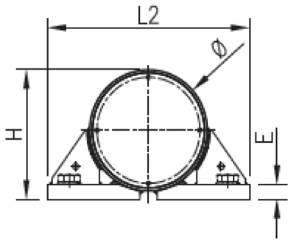
Standard dynamic test curve

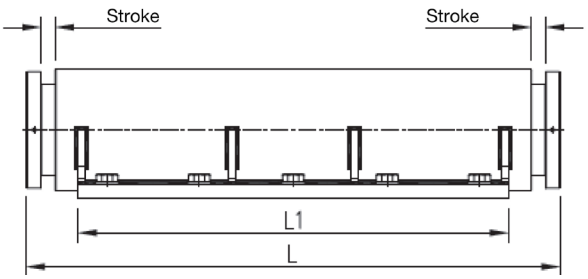
Freyssinet Services

Freyssinet can produce preliminary and construction designs for structures equipped with earthquake protection devices.

Local sales contact

Range





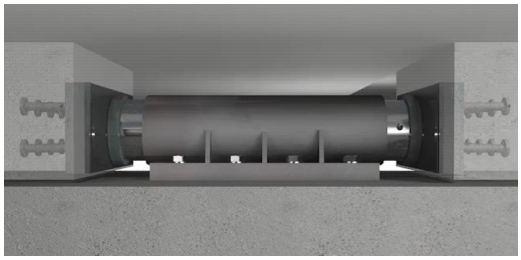
F: Force
F_{max}: Maximum force
K: Stiffness
L: Length
H: Height
Ø: Diameter
L1: Length 1 of mounting plate
L2: Length 2 of mounting plate
T: Thickness

Type	F_0 kN	Stroke mm	F_{max} kN	K kN/mm	L mm	H mm	Ø mm	L1 mm	L2 mm	T mm
PDS 100-290-50	100	±50	290	1.6	660	155	130	520	260	25
PDS 100-290-100	100	±100	290	0.8	1020	165	130	780	260	35
PDS 250-670-50	250	±50	670	3	900	215	180	760	360	35
PDS 250-670-100	250	±100	670	1.5	1370	230	180	1130	360	50
PDS 500-1210-50	500	±50	1210	5	1130	285	240	990	480	45
PDS 500-1210-100	500	±100	1210	2.5	1680	305	240	1440	480	65
PDS 750-1660-50	750	±50	1660	7	1220	320	270	1080	540	50
PDS 750-1660-100	750	±100	1660	3.5	1800	340	270	1560	540	70
PDS 1000-2000-50	1000	±50	2000	10	1300	345	290	1160	580	55
PDS 1000-2000-100	1000	±100	2000	5	1870	360	290	1630	580	70
PDS 1500-3000-50	1500	±50	3000	12	1520	415	350	1380	700	65
PDS 1500-3000-100	1500	±100	3000	6	2190	435	350	1950	700	85
PDS 2000-3610-50	2000	±50	3610	20	1610	460	390	1470	780	70
PDS 2000-3610-100	2000	±100	3610	10	2240	480	390	2000	780	90
PDS 2500-4520-50	2500	±50	4520	25	1670	505	430	1530	860	75
PDS 2500-4520-100	2500	±100	4520	12.5	2280	520	430	2040	860	90
PDS 3000-5420-50	3000	±50	5420	30	1740	545	470	1600	940	75
PDS 3000-5420-100	3000	±100	5420	15	2350	565	470	2110	940	95

Range given for guidance: prestressing force, stroke, stiffness and damping cœfficient can be adjusted to meet specific requirements.

Structural connections

Different configurations for installation on the structure are possible. Freyssinet offers an appropriate connection solution for each configuration.



Installation of the ISOSISM® PDS

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