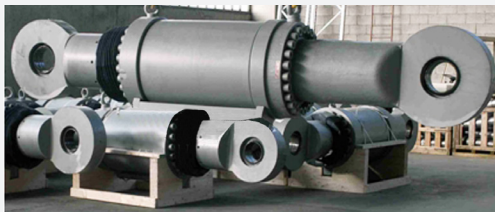


General description

The ISOSISM® FD (Fluid Damper) is a hydraulic damper using a viscous oil that is stable under temperature variations and over time.

It is made up of a body with two chambers separated by a piston. The piston is secured to a rod connected to one of the clevis mountings and the damper body is secured to the other clevis mounting. The damper works in both traction and compression.

The damping provided by the FD is obtained by the oil flowing through the piston, which is equipped with specially designed valves.



ISOSISM® FD



Applications

ISOSISM® FD dampers do not prevent very slow displacements such as those due to thermal variations. They react in the event of an earthquake and dissipate some of the seismic energy.

These dampers can be used in addition to isolators, in order to increase the overall damping provided by the earthquake prevention equipment.

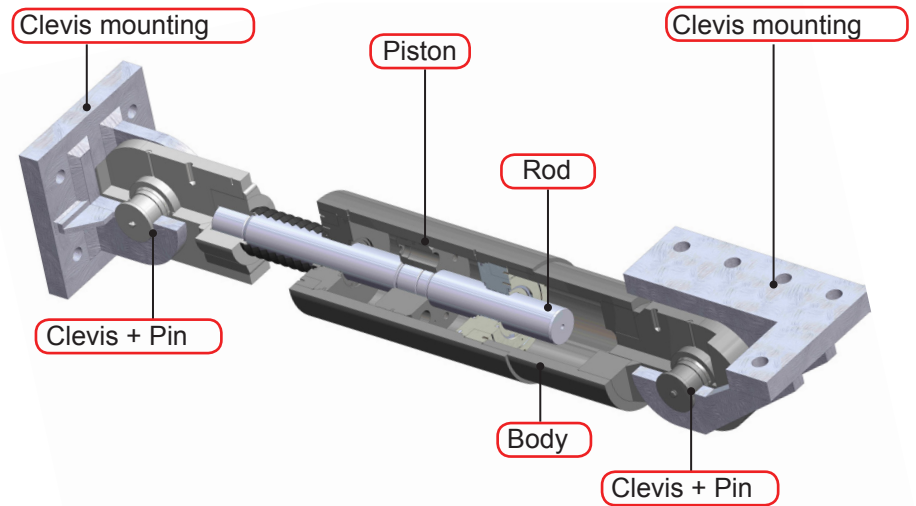
Fitting a structure with dampers reduces civil engineering costs. It also ensures the integrity of the structure during and after an earthquake and reduces maintenance costs.

Dampers can be installed in new structures or to bring existing structures in line with current standards. Freyssinet has installed nearly 1,000 ISOSISM® FD dampers in recent years.



ISOSISM® FD installed underneath a bridge deck

Design



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

Behaviour law

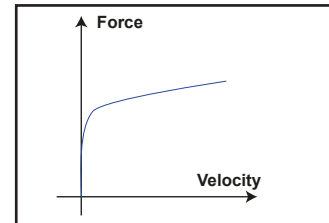
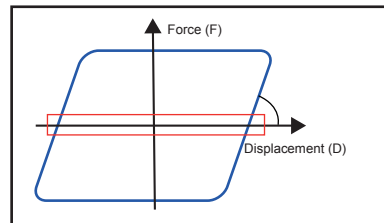
The ISOSISM® FD operates using a controlled-opening valve system with the following law:

$$F = C \cdot V^\alpha$$

(α can range between 0.05 and 2. Typically equal to 0.1).

F: Force C: Damping constant V: Velocity α : Damping coefficient

— Low Speed — High Speed



Graphic representation

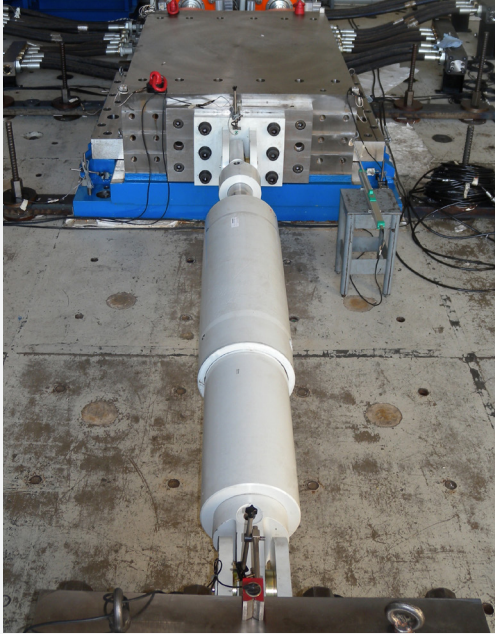
The device can be shown on a structure using the following graphic representation in accordance with EN 15129.

Graphic representation of an ISOSISM® FD
plan view and elevation



Tests

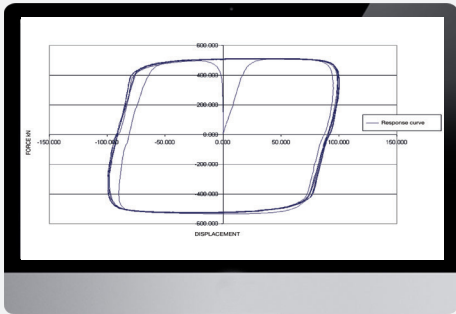
ISOSISM® FDs have undergone numerous dynamic tests to guide and validate Freyssinet's technical development process.



ISOSISM® FD during testing

CE marking

ISOSISM® FD dampers can be supplied with CE marking.



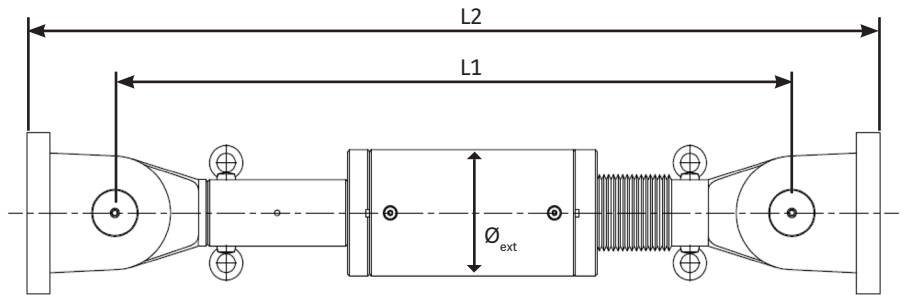
Standard dynamic test curve

Freyssinet Services

Freyssinet produces preliminary and construction designs for structures equipped with earthquake protection devices, including viscous dampers.

Local sales contact

Range



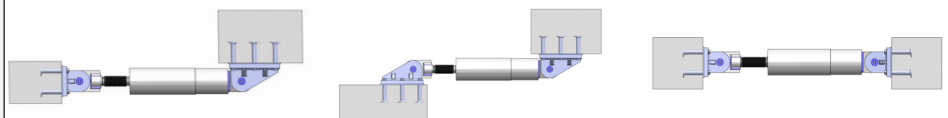
- F_{max} : Maximum force
- D_{max} : Maximum displacement
- L1: Length between pin centres
- L2: Length overall
- \varnothing_{ext} : External diameter

Type	F_{max} kN	D_{max} ± mm	L1 mm	L2 mm	\varnothing_{ext} mm
FD 1000/200	1000	± 100	1345	1710	298
FD 1000/400	1000	± 200	1895	2260	298
FD 1500/200	1500	± 100	1410	1840	313
FD 1500/400	1500	± 200	1960	2390	313
FD 2000/200	2000	± 100	1500	2000	324
FD 2000/400	2000	± 200	2050	2550	324
FD 2500/200	2500	± 100	1565	2115	358
FD 2500/400	2500	± 200	2116	2665	358
FD 3000/200	3000	± 100	1680	2280	396
FD 3000/400	3000	± 200	2230	2830	396
FD 3500/200	3500	± 100	1795	2475	424
FD 3500/400	3500	± 200	2345	3025	424
FD 4000/200	4000	± 100	1865	2575	448
FD 4000/400	4000	± 200	2415	3125	448

Structural connections

The two ends of the device are fitted as standard with special pins and balls that allow three degrees of rotational freedom. The device is secured to the structure by means of two clevis mountings bolted to inserts embedded in the concrete, or directly to a steel structure.

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



Traction/Shear Connection

Shear/Shear Connection

Traction/Traction Connection