

Dispen™ Bi-Mode Damper

Designed to reduce TCO*

Very efficient for trains operating on winding lines, the Bi-Mode Damper reduces the track and wheel-wear while enhancing passengers' safety and comfort.

100% mechanical, the Bi-Mode is a plug & play damper offering high reliability.

A Bi-Mode Damper adapts damping force in curves thanks to an ON/OFF mode

HIGHLIGHTS

Higher performance:

- Y/Q lateral force ratio decreased by more than 10%
- Ride index comfort improved by up to 20%

Maintenance cost savings:

- Wheel & rail wear reduction up to 20%
- 3.5 million km before first maintenance

Customer applications

- Deutsche Bahn: Coradia regional trains
- SNCF: TGV
- Municipalities: Citadis trams

GENERAL DESCRIPTION

Alstom Dispen™ range of Linear, Friction and Bi-Mode Dampers delivers optimal train dynamics, safety and passenger comfort for all types of trains.

The Bi-Mode Yaw Damper principle is to adapt the damping force in curves through a passive ON/OFF mode enabling wheel-wear lateral force reduction and preserving the train structure. It represents a real alternative to electronic-driven dampers: While keeping all the benefits of a classic yaw damper in terms of cost, reliability and lifetime thanks to its 100% mechanical design, the Bi-Mode Yaw Damper greatly improves passenger comfort and reduces track and wheel-wear with immediate effect on operator's total cost of ownership.

CUSTOMER BENEFITS

Reduced track & wheel-wear

Compared to classic yaw dampers, the damping force released by the Bi-Mode Damper in curves generates an average 10 to 20% wheel-track lateral force contact decrease. 4 types of savings for operators:

- Wheel-wear reduction up to 20% (~4% of total bogie maintenance cost reduction)
- Reduction of maintenance operations and frequency linked to effort decrease (wheels, axles)
- Rail-wear reduction in curve leading to infrastructure cost and time savings
- Energy consumption reduction in curve

Plug & play integration

Patented, the switching function is 100% mechanical and is integrated within the Bi-Mode Damper. No external device is needed, or power supply or bogie adaptation, which allows 3 to 5% savings on integration costs compared to an electronic-driven damper. The switching function is based on curve radius, ensuring reliability without any specific maintenance or calibration during train operation. In addition, the Bi-Mode Damper operates in any position, even horizontal, ensuring a smooth integration for train manufacturers and quality for operators.

Improved passenger safety & comfort

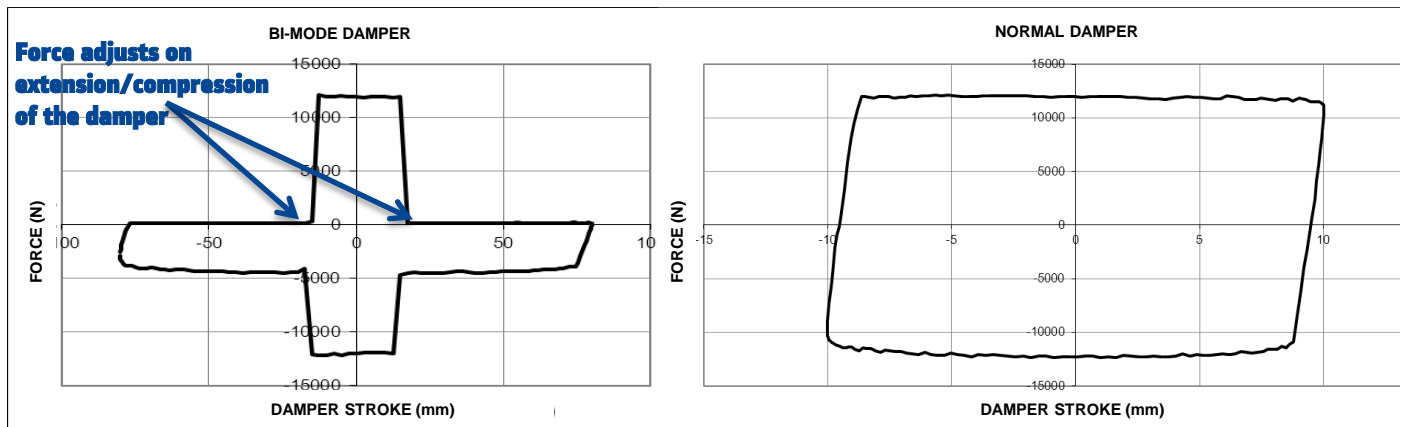
When the **Bi-Mode Damper** operates on "OFF" mode in curves, carbody shell lateral accelerations are reduced, leading to Y/Q (Y = Load in transversal direction & Q = Load in vertical one) safety ratio improved by 10%, with a comfort ride index also improved by up to 20%. Therefore, compared to classic yaw dampers, the Bi-Mode Damper enhances passenger safety and comfort, especially in tight curves. Bi-Mode applied on bogie lateral dampers and anti-roll carbody dampers can also be a solution to improve the lateral comfort by ~ 10%.

Customization & extended lifetime

Dispen™ dampers are hand-made to guarantee quality, reliability and production flexibility. It also allows design customization to answer specific requirements: high damping force at very low speed, winterization, etc. The Bi-Mode Damper provides even more flexibility as the switching function can easily be adapted to customers' needs, such as the damper stroke. As all Dispen™ Dampers, the Bi-Mode Damper offers high lifetime before first maintenance thanks to its mechanical design: more than 3.5 million km.



Bi-Mode Damper Principle



On a standard damper, for a given speed, damper force is constant in relation to damper stroke.

On a Bi-Mode damper, force can change when damper stroke reaches a configurable length.

As damper stroke is directly linked to the curve radius, damper force can be managed according to train operation.

Innovation Trophy awarded at SIFER

Alstom was awarded the Mecateam Cluster innovation trophy for the development of its Bi-Mode Damper at the SIFER railway salon held in Lille on March 24-25, 2015.

Developed since 2011 by Alstom, the Bi-Mode Damper is patented. It was conceived at the Alstom Dispen™ centre, specialized in the development, manufacturing and maintenance of dampers for the rail industry.

Based at Le Creusot, France, the Dispen™ centre has 33 employees.



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