

Cars love comfort

Superior NVH solutions
for vehicle dynamics

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Chemistry-driven innovation for future mobility

#1

chemical supplier
to the automotive
industry

#1

in the Patent
Asset Index™

15

major R&D
centers globally

BASF is the leading chemical partner for the automotive industry. Together with our customers, we develop innovative and sustainable solutions for the mobility of tomorrow. Through our processes, technology know-how, market expertise and global footprint, BASF continuously strives to be the trusted partner for current and future market demands, such as emission reduction and control, alternative powertrains, lightweight construction, intelligent heat management, design freedom as well as comfort and safety.



Cellasto® – The NVH Solution We Innovate for Customers' Success

For over a half century, under the brand name Cellasto®, BASF has developed and produced components made of microcellular polyurethane elastomers. The special physical properties distinguish Cellasto® as an outstanding engineering material that reduces Noise, Vibration and Harshness (NVH) in vehicles, contributing significantly to driving comfort and safety.

Cellasto® components offer:

- Good static and dynamic long-run behavior
- High-volume compressibility with minimal lateral expansion
- Low dynamic hardening and amplitude-selective damping
- Low compression set
- High-abrasion resistance
- Resistance to cold, heat and moisture
- Resistance to oil, grease, ozone and other important media

1960s

- Cellasto® technology debuts in Lemförde, Germany
- Auto Union (formerly Audi) the first customer
- Production starts in Japan
- Customers include Toyota, Mercedes, BMW and Porsche



1970s

- Cellasto® technology becomes part of BASF organization
- First jounce bumper supplied for VW Passat
- Opel becomes a customer

1980s

- Production starts in USA
- Business of Cellasto® NVH applications grows fast
- New customers include Saab, Jaguar and GM



1990s

- First technical center founded in Lemförde, Germany
- Production starts in China
- Korean OEMs become customers
- Numerous commendations such as Ford Q1 Award received

2000s

- Lemförde production of Cellasto® parts hits 450,000 per day
- Production capacity expands in USA



2010s

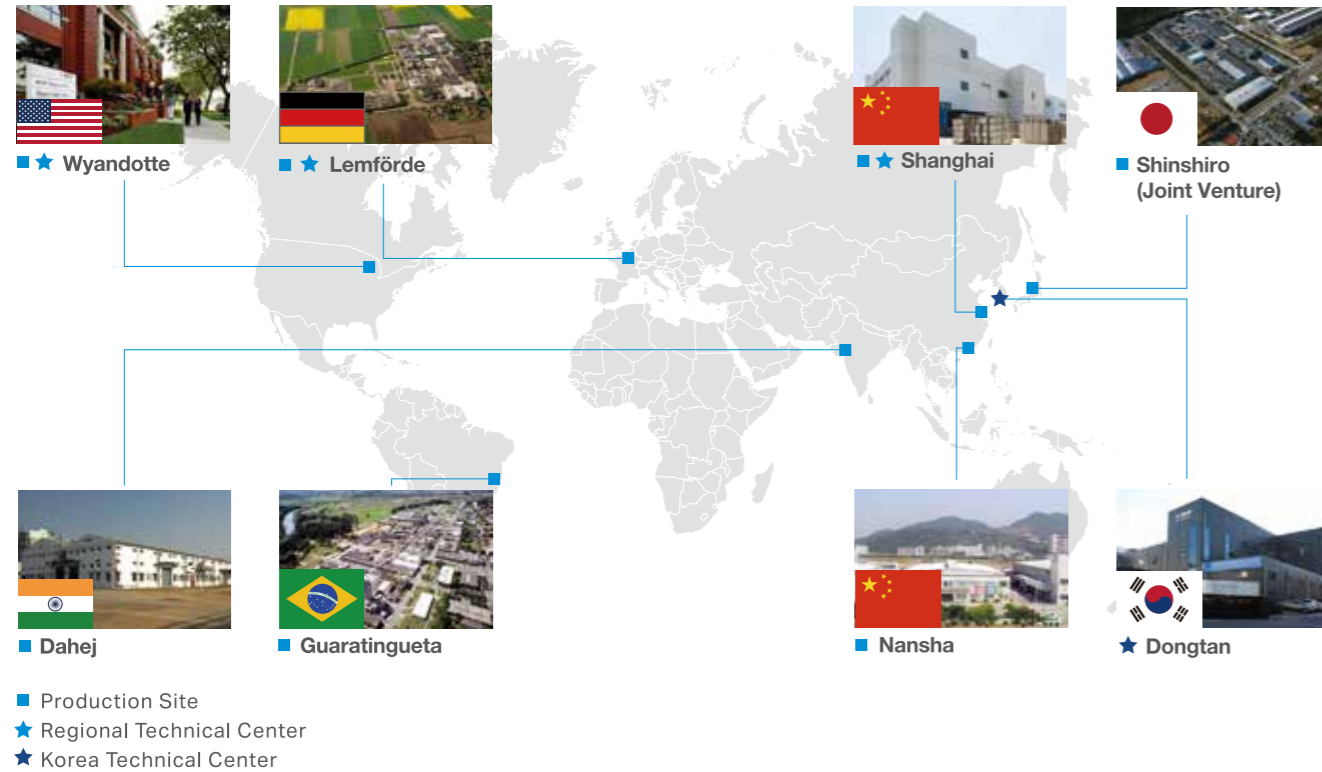
- New production site launches in Shanghai, China
- Global Business Management established in Shanghai
- Plastic top mount, TPU coil spring isolator, Elasturan®/Elastolit® NVH parts among new innovations



Globally Networked, Locally Integrated

Vehicle platforms produced all around the world. With Cellasto® sites on four continents, we are where our customers are. We provide our global expertise and local advantages with:

- Global key account management
- Global database and calculation platform
- Regional technical centers
- Local production and supplies
- Local language services



Some of our global partners...



Quality, Environment, Health and Safety – Our No.1 Priority



Priority QEHS

Quality, Environment, Health and Safety – QEHS – our number one priority. We do not compromise on QEHS.



Best Team

Our competent global team has more than 50 years of experience in this business and is committed to supporting our customers at all times.



Continuous Improvement

Lean Six Sigma and Operational Excellence are deeply implemented in our organization. Employee suggestions and global exchanges of best practices drive our continuous improvement and lead to best in class processes and products.

Customer Focus

The performance of our products and services create value for our customers. We are dedicated to our customers' success.

Customer awards:

The confirmation of our quality excellence ...



Cellasto® Products

Chassis

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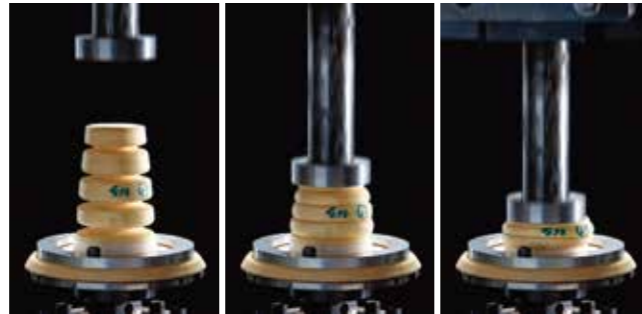


Jounce Bumper

The chassis is exposed to special stresses when driving under different road surfaces – especially potholes. The wheel speeds with enormous force towards the body. As the key component of suspension system, Cellasto® jounce bumpers can reduce the movement by damping and absorbing the energy peaks, making driving more comfortable.

Technical Advantages

- Effectively eliminate energy peaks
- Amplitude dependent damping
- High-volume compressibility
- Abrasion and fatigue resistance
- Durability



In the enclosed space test, rubber (right) expands laterally and shatters the glass. Cellasto® jounce bumper (left) can be compressed by up to 40% of original height without lateral expansion.

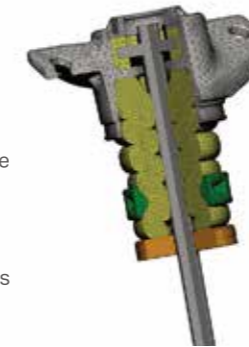
➔ Higher volume compressibility than rubber



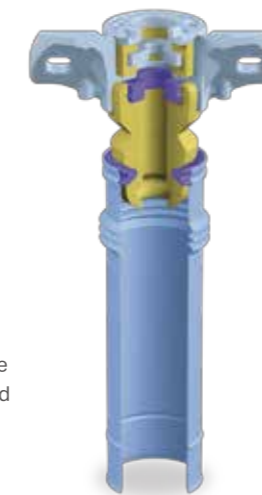
Customized Solutions

As a customized solution, Cellasto® jounce bumpers are always designed to meet customers' requests. We offer:

- Up to 95% accurate design provided by the FEA-simulation system
- Optimizable load deflection behavior (stiffness curve)
- Customized designs and supplies of the mounted / attached parts
- Low initial stiffness
- Different materials according to customers' requirements and technical needs



Our FEA simulations of the Cellasto® components provide insights denied in rig testing. For example, optimizing the geometry is easier and faster.



We can supply top mount, jounce bumper and dust tube together in the preassembled component group.

Different series of jounce bumpers have been developed according to the requirements of OEMs.



In addition to light vehicles, Cellasto® jounce bumpers are applicable to other transportation tools, like motorcycles, trucks, buses, etc.



Coil Spring Isolator

Whether steel coil or pneumatic springs – the chassis suspension must be very resilient. The coil spring rests on a special spring isolator that isolates the passengers from vibrations caused by the road surface. Cellasto® coil spring isolators are the ideal products to effectively dampen the resonance, and at the same time isolate body noise.

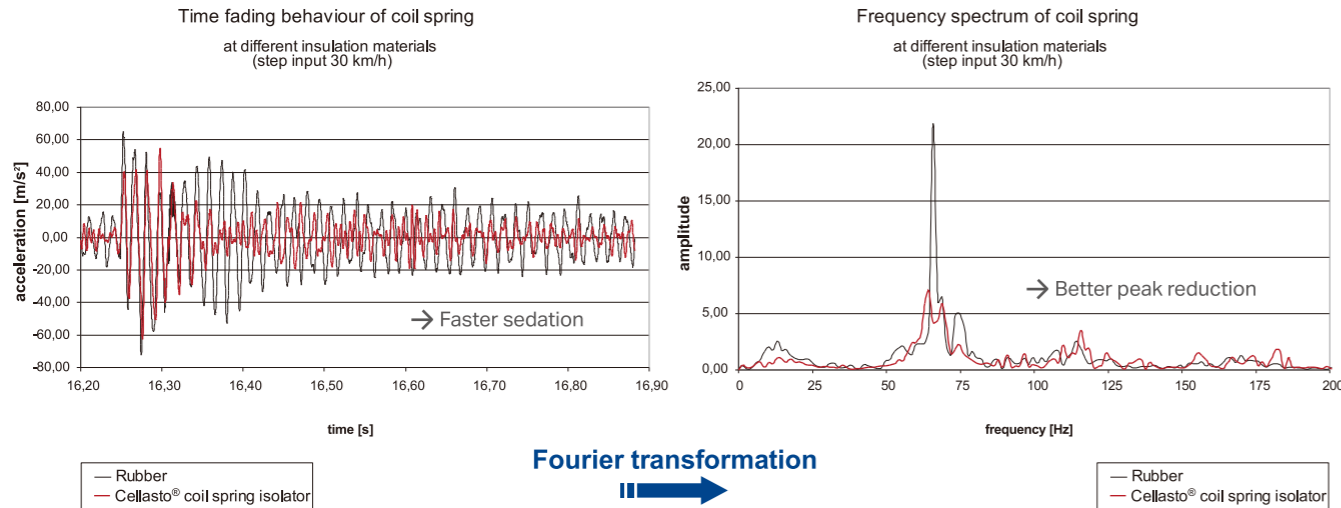
Technical Advantages

- Effectively reduce resonance-related energy peaks
- Excellent fatigue strength
- High-abrasion resistance
- Negligible creep and low compression sets



Acceleration at steel spring, vertical direction.
Track: Positive impact 30 km/h

➔ Better noise isolation than rubber



Customized Solutions

Depending on customers' requirements, we can combine the coil spring isolators with an end stop or jounce bumper so as to integrate vibration damping with limitation of spring travel in one component. This reduces assembly effort and saves costs.

Cellasto® Single Piece Coil Spring Isolator / Jounce Bumper

Cellasto® coil spring isolators can be integrated into the jounce bumper. It provides:

- Cost savings
- Improved NVH characteristics
- Durability



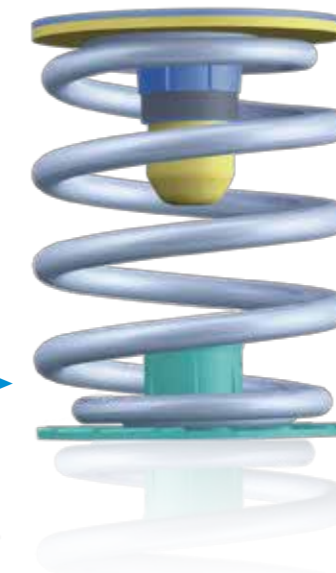
Cellasto® Multi-Piece Coil Spring Isolator / Jounce Bumper

Cellasto® microcellular polyurethane (MCU) and thermoplastic polyurethane (TPU) can be brought together to improve energy management, increase durability, create design flexibility and reduce noise.

Example:
Combination of Cellasto® and Elastollan® TPU

Integrated lower TPU coil spring seat and isolator:

- Up to 15% weight savings
- Reduced noise
- Enhanced isolation
- Improved ride and handling
- Reduced forces in the car body by up to 25%



Integrated upper MCU/TPU coil spring seat, isolator and jounce bumper:

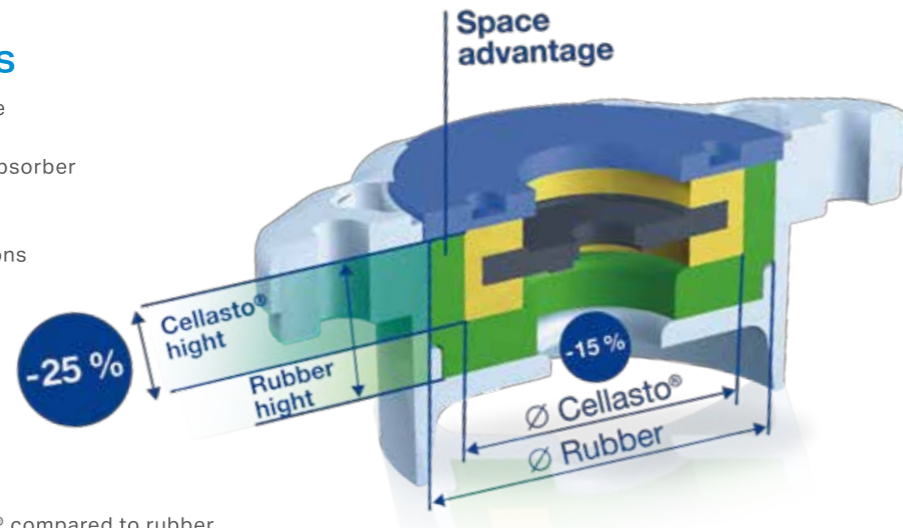
- Up to 25% increase in energy management capability
- Up to 30% improvement in durability
- Enhanced isolation
- Improved ride and handling
- Increased design flexibility
- Independent ride tuning of jounce bumper and isolator

Top Mount

In vehicle construction, top mounts provide the link between the shock absorber and the chassis and therefore have a decisive influence on driving comfort and dynamics. Cellasto® top mounts can substantially reduce noise, vibration and harshness, adding to the driving comfort.

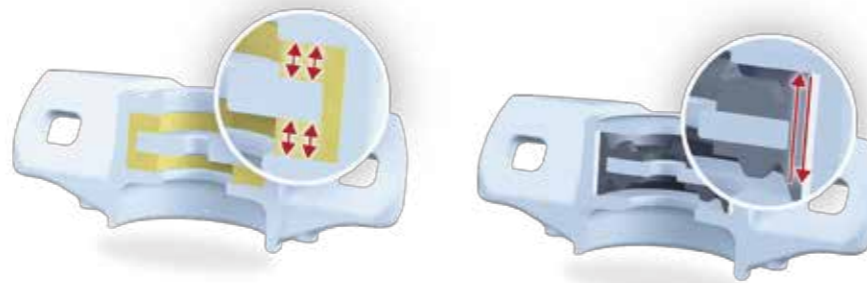
Technical Advantages

- Reduced weight and package space
- Outstanding resilience
- Increased efficiency of the shock absorber
- Excellent fatigue strength
- High durability
- Dual and single load path applications



Less space consumption of Cellasto® compared to rubber.

➔ Smaller housing, less weight and more cost effective



Cellasto® and rubber top mounts usually differ in their mechanical mode of operation. Cellasto® utilizes compressive loading, rubber uses shear.

➔ Cellasto®: Lower transverse lateral expansion and higher resilience

Customized Solutions

Our proven standard approach is to develop and implement the optimal solution for each of our customers' needs. To ensure that Cellasto® top mounts meet the performance specifications, we are continuously refining our production processes, developing our technical design resources and optimizing stiffness and hardening behavior.

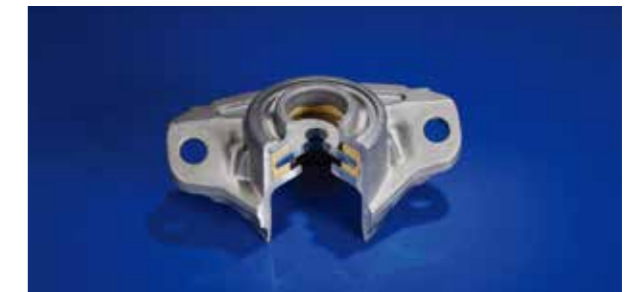
Dual load path application
(Combined with Cellasto® jounce bumper)



Single load path application
(Combined with Cellasto® jounce bumper)



Design as functional parameter. Depending on the requirements, the function can be influenced via the geometry.



Plastic Top Mount

Unique combination of Cellasto® bearing with Ultramid® housing.

Technical Advantages

- 25% lighter than conventional aluminum die-cast versions with rubber
- Functional integration of top mount, jounce bumper and dust tube
- Best NVH properties: very good damping and pleasant acoustics
- Shorter process chains: complete BASF expertise for complex part from one source – material, design and quality management
- Global use of components possible

→ Lightweight, CO2 savings,
functional integration, comfort

Cellasto®

Microcellular polyurethane elastomer:

- Very good static and dynamic behavior
- Long usage life
- Small installation space

Ultramid®

Polyamide with 50% glass-fiber reinforcement:

- Excellent strength and stiffness also at high temperatures
- Optimized for dynamic loads
- Well-proven plastic specialty for crash-relevant car parts

Cellasto® Jounce Bumper

Protecting Tube

Tailor-made simulation

Precise calculation of the highly-loaded plastic component is provided by BASF's simulation CAE tool Ultrasim®. It offers:

- Short development time
- Optimum use of material
- Lowest possible weight



New NVH Solutions

Cellasto® new NVH solutions extends our well-established portfolio to create new applications with the best NVH performance in small packages. By combining acoustic isolation at high frequencies with high damping at large amplitudes, we can help you design optimal innovations in acoustic comfort, vehicle dynamics and safety.

Subframe Mount

Technical Advantages

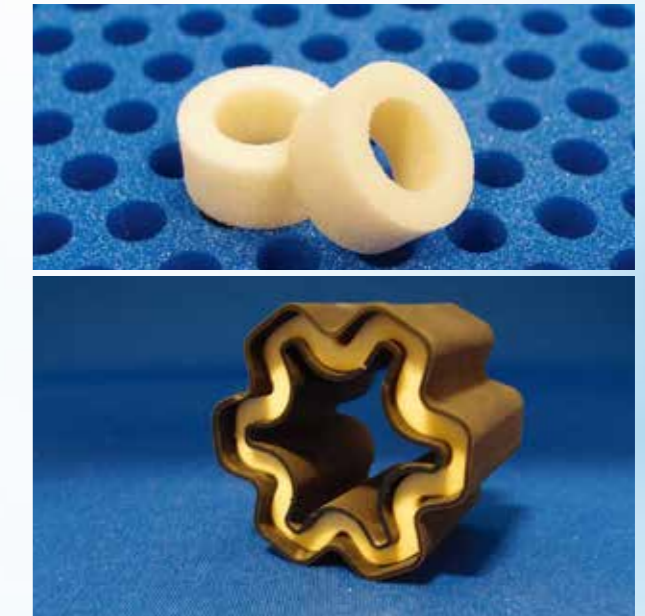
- Low dynamic stiffening
- Large stiffness spread in X-Y-Z possible
- Hybrid mount in compact and microcellular polyurethane is possible



Steering Mount and Steering Isolation

Technical Advantages

- Optimized handling due to high torsional stiffness
- Improved NVH by superior isolation
- Compact packages





Mount for Head-Up Display

Technical Advantages

- No vibrations of displayed information
- Very compact packages
- High durability



Mount for Compartment Door Drive

Technical Advantages

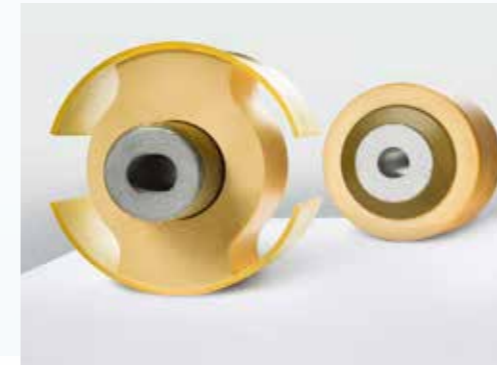
- Improved acoustic isolation
- Safe transfer of forces
- Integration in smallest packages



Mount for A/C and Air Compressor

Technical Advantages

- Optimized acoustic isolation
- Reduced resonance effects
- All-in-one solution



Mount for Electric Motor

Technical Advantages

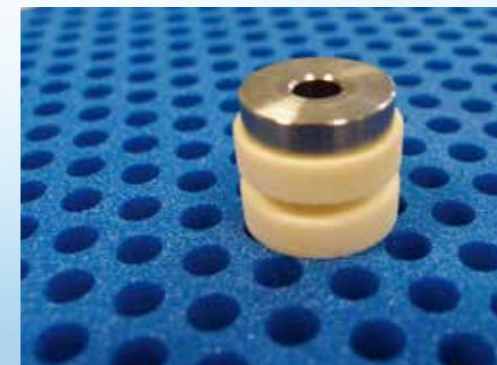
- Improved acoustic at high frequencies
- Safe control of powertrain movements
- High durability
- Low weight



Gearbox and Differential Mount

Technical Advantages

- Elimination of gear-whine noise
- High durability
- Low dynamic stiffness



Battery-Pack Mount

Technical Advantages

- Best performance in small packages
- Low weight
- High durability
- NVH improvement