

# Railway products

Performance and safety





## INTRODUCTION

Our company is the only supplier of railway shock absorbers in Slovakia, our producer is located in Budapest, Hungaria. Our profile covers small series production consequently our advantage is flexibility.

According to the needs of our clients our company undertakes production of only one shock absorber if it is needed.

The series developed during the previous years can be adapted into the given installation environment, so almost any needs of our clients can be met.





## PRODUCT RANGE AND SERVICES

### - Production

Our railway shock absorber supply is spread for the following installation places:

- **Primary damping**
- **Secondary vertical damping**
- **Secondary horizontal damping**
- **Horizontal yaw damping**

Our shock absorber series adapt to the needs of train bogie. Narrow installation place, dusty environment, high palliative force and of course horizontal installation cannot cause any problem.

With the renewal of our shock absorbers their lifespan can be extended so that they are to operate for 25-30 years with the appropriate maintenance.

### - Recycling

Besides production of shock absorbers wide range of them is renewed. Together with repairing of our own shock absorbers the products of other producers are repaired as well: Koni, Sachs, STOS, Gerep, etc.

### - Design

We undertake design and production of new shock absorbers besides our own ones. Specialities of installation environment are taken into consideration during designing. Wide range of rubber mounting and metal elements are available. We are ready to design and produce only one shock absorber within short deadline





## SERIES K142 AND K143

### - Primer, Seconder and Transversal Shock Absorbers of Railway Bogie

Construction of K142 and K143 railway shock absorber series follow the requirements imposed by the modern shock absorbers:

- **Metal-free contact between friction elements.**
- **Valve-controlled damping.**
- **High-pressure seals for precise adjusting.**
- **Bleeder system is used.**
- **Foaming-free system is used.**
- **Renewable and ready-to-assembly implementation.**
- **Hardened, chrome plated piston rod.**
- **Extra high protection against dust (with K143 series).**

#### Technical specifications:

Max. damping force at 0,1m/s: 6 kN  
Diameter of dust protector tube/house:  $\varnothing 90$  mm /  $\varnothing 80$  mm

The above mentioned characteristic features result in long-life usage. Their renewability makes them more valuable. The lifetime of these shock absorbers can reach 25-30 years, besides continuous maintenance. It is not a negligible fact that the costs of renewability is much lower than that of a new shock absorber.



K142 and K143 railway shock



## SERIES K144

### - Railway Bogie Shock Absorber. Maximal damping force: 12 000 N

Series K144 is designed for high load with robust size. Series K144 doubles the maximum damping force of standard shock absorbers and this way it provides proper damping for massive vehicles.

#### Specifications:

- Robust design.
- Mounting elements and silent blocks which fit high damping forces.
- Hardened, chrome plated piston rod.
- Metal-free contact between friction elements.
- Valve-controlled damping.
- Max. damping force 12 000 N at 0,1 m/s piston velocity

#### Technical specifications:

Max. damping force at 0,1 m/s: 12 kN

Size of dust protector tube/house:  $\varnothing 110$  mm /  $\varnothing 100$  mm

K144 shock absorbers are designed for longlife usage due to their design (material quality, up-to-date construction, appropriate surface protection).





## SERIES K145

### - Railway bogie shock absorber with short installation sizes

K145 railway shock absorber series is a hybrid version of series K142 and K143. Due to bogie construction it might happen that there is not enough space for the installation of an average size and stroke-length shock absorber.

That is why our engineers designed the compact version of the most popular series which minimum installation height allows construction of quite short shock absorbers:

- **Space-saving construction.**
- **All positive features of K142 and K143 can be found in system K145.**
- **Hardened, chrome-plated piston.**
- **Bleeder system is used.**
- **Foaming-free system is used.**
- **The most modern seal system is applied.**
- **Renewable and ready-to-assembly product.**

Lifespan of Series K145 is the same as the ones of K142/143 because they inherited all the specifications which increase their lifetime so the greatest advantage of this system is the previously mentioned compact design.

### Technical specifications:

Max. damping force at 0,1m/s: 6 kN

Diameter of dust protector tube/house:

Ø90 mm / Ø80 mm



## SERIES K146

### - High performance horizontal yaw dampers

The most typical needs of railway vehicle operators these days is to develop high speed railway lines and to purchase high speed vehicles associated with them. Thus, demand on behalf of railway vehicle manufacturers has grown for rail car shock absorbers which are able to resist the extreme stresses accompanying high speed travel reliably on the long term and to provide appropriate comfort to passengers. Our company developed the product lines K146 and K147 for rail car shock absorbers to meet these requirements.

At high speed the effect of so-called unstable run may be encountered when the bogie truck turns away freely in horizontal directions under the car body (wobbling). In order to prevent the low amplitude swaying movements the low mass bogie is stabilised with a shock absorber structure against the large mass body car, which is considered to be a fixed point in this respect. This is why these devices are called rail car sway control shock absorbers. Two key requirements for the characteristic curve of the shock absorbers is to be similar to the characteristic curve of a friction shock absorber but to avoid all disadvantages of the former.

Another fundamental requirement is to allow the installation of the shock absorbers in horizontal position, for which our company developed a simple but efficient method.

Thanks to the valve design of the K146 system these products can be used not only to serve the purpose of sway control shock absorbers but also as shock absorbers between car bodies (anti-roll dampers) or in any other places of installation for vehicles with higher damping force requirements.

#### Key features:

- Robust built to absorb extensive damping forces
- Fastening components providing large angular displacement
- Damping force adjustable in a wide range
- Damping force adjustable irrespective of the direction of stress
- Custom built valve design developed by Kárászy Kft.
- Rail car sway control shock absorbing design to be applied in high speed (>250km/h) vehicles
- Mountable, recyclable design
- No metallic contact between friction elements

Engineers at our company have considered the long term useful lifetime up to 25 years as a fundamental design consideration when designing the K146 product line. In order to achieve this wearing parts and components were applied so that they did not contact with metallic contacts and if they are replaced periodically, you can say that the shock absorber has gained an unlimited useful lifetime.

#### Technical specifications:

Max. damping force at 0,1m/s: 20 kN Diameter of dust protector tube/house:  $\varnothing$  110 mm /  $\varnothing$  100 mm



## SERIES K147

- **General solution for high-speed railway applications**  
**Primary and secondary vertical/horizontal dampers**

The most typical needs of railway vehicle operators these days is to develop high speed railway lines and to purchase high speed vehicles associated with them. Thus, demand on behalf of railway vehicle manufacturers has grown for rail car shock absorbers which are able to resist the extreme stresses accompanying high speed travel reliably on the long term and to provide appropriate comfort to passengers. Our company developed the product lines K146 and K147 for rail car shock absorbers to meet these requirements.

The development of the K147 system took place in parallel with that of the K146 line. The design aim was to create a modern valve controlled architecture which is suitable to produce shock absorbers with sway control properties (K146) and to attenuate the oscillation of primary and secondary suspension system elements (K147). Damping force of the product line K147 can be adjusted in a wide range and hence, almost any needs can be met by it.

### Key features:

- Damping force adjustable in a wide range
- Damping force adjustable irrespective of the direction of stress
- Applicable in high speed (>250km/h) vehicles
- Mountable, recyclable design
- No metallic contact between friction elements
- Increased amount of oil for efficiency
- Double anti-dust protection
- Custom built valve design developed by Kárászy Kft.



Due to the increased oil volume the warming up of the shock absorber is slowed down, therefore the useful lifetime of the oil will be extended which means operational safety on the long run. Since safe running stability of railway vehicles travelling at a high speed can only be ensured with the use of appropriate shock absorbers, our company developed the product lines K146 and K147.

### Technical specifications:

Max. damping force at 0,1m/s: 10 kN  
Diameter of dust protector  
tube/house:  $\varnothing 90$  mm /  $\varnothing 80$  mm

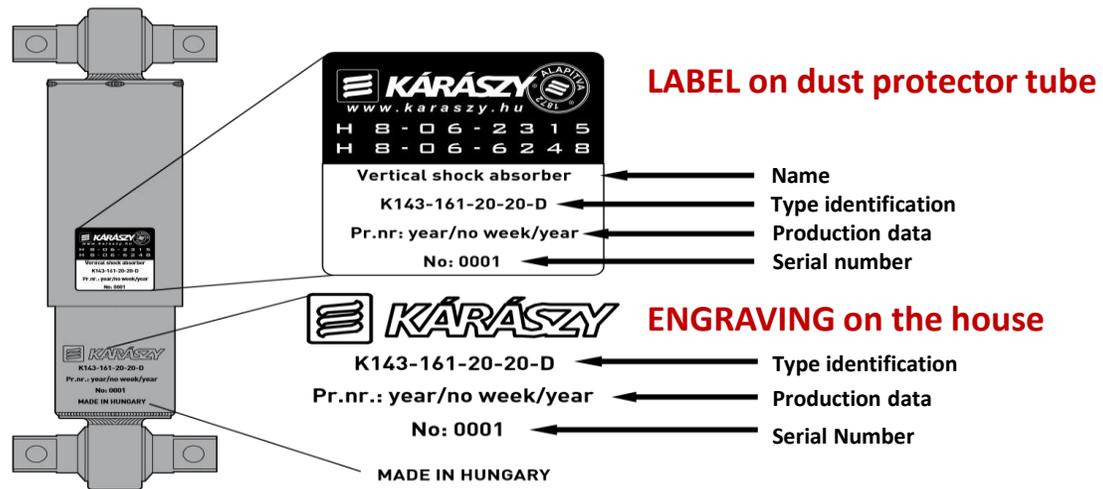




## TECHNICAL DESCRIPTION

### - Identification

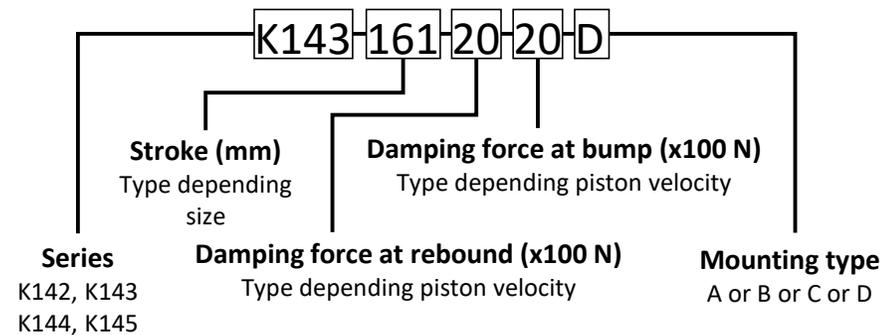
Identification of shock absorbers are according to the following scheme:



### - Explanation of type identification

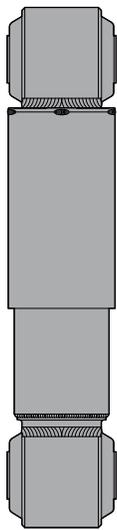
Identification of the shock absorbers based on their parameters:

Example:

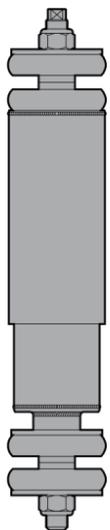




## MOUNTING TYPES:



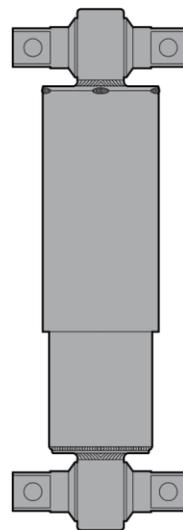
**A type**  
Eye-eye



**B type**  
Pin-Pin



**C type**  
Pin-eye or  
eye-pin



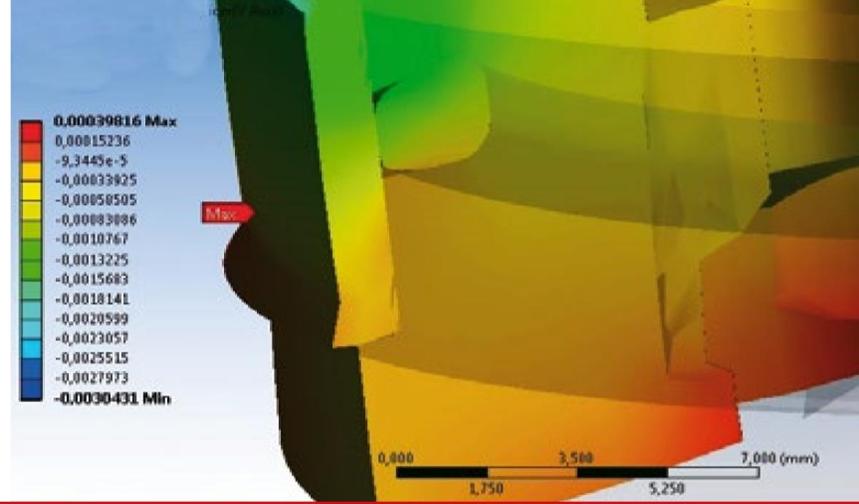
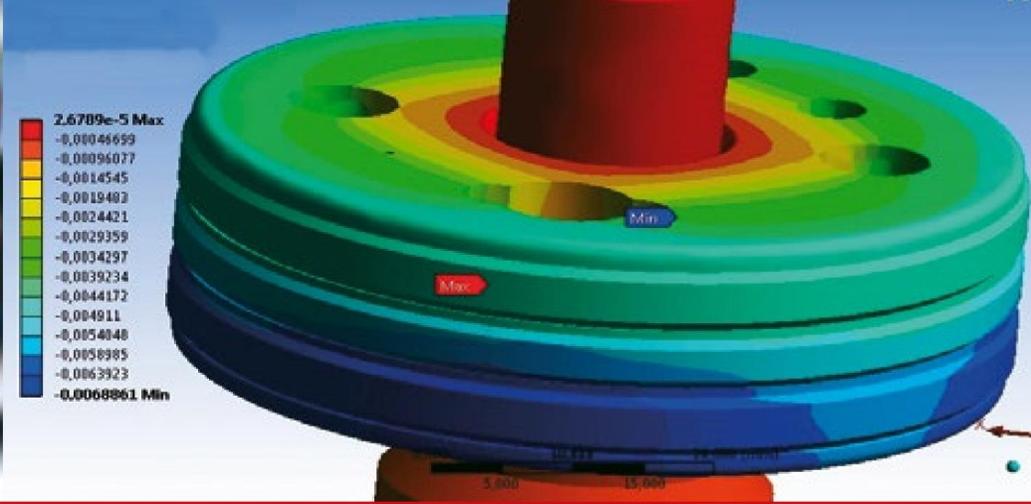
**D type**  
Special

## - Construction

All of our series work with twin-tube system. Advantages of twin-tube systems are robust construction and insensitivity against damage.

Due to the special geometry, shock absorbers have symmetric characteristics but there might be some kind of differences as well. The prescribed attenuation characteristic of shock absorbers is adjusted by a selfdesigned equipment before its assembly. With this method we ensure that the attenuation parameters of self-assembly shock absorbers perfectly meet the expectations.





## RESEARCH & DEVELOPMENT

- There's more innovation underway today at Kárászy than at any time in our more than a century history...

The shock absorber is a product which directly affects the vehicle performance and equalizing the safety and comfort. In this respect, the shock absorber is a precious equipment which is likely to seal the fate of the vehicle and thereby the passengers.

The teams of Kárászy engineers work with close contacts to customers in worldwide or regional product adaptations and tests. Furthermore, the R&D employees ensure that innovations and trends from all over the world flow into the concept phase of future products of Kárászy Ltd.

Rigorous R&D studies are being conducted within Kárászy Ltd. in an innovative method, in harmony with the developing technologies and with the aim to become a leader in the global market. Such studies reveal a great importance in improving our customer-centered standards.





## References

- Our railway shock absorbers are delivered not only to Hungarian clients but abroad as well: Austria, Egypt, Romania, Poland, Russia, USA, India, Bulgaria

### MAIN REFERENCES:

- Hungarian State Railway (HU)
- Ganz-Holding (HU)
- Public Transport of Budapest (HU)
- Bombardier (C)
- Stadler (SZ)
- GySev (AU-HU)
- Linsinger Austria Gmbh. (AU)
- Reloc (RM) • Softronic (RM)
- Diesel Loko Distribution (PL)
- Trolley Support (USA)
- Sequoia Safety (II)
- Interkom (BU)

### QUALITY CERTIFICATES:

Our activities are carried out according to the following quality management systems: **ISO 9001:2009, EN ISO 14001:2005, DIN EN 15085-2 CL1, EN 13802.**

