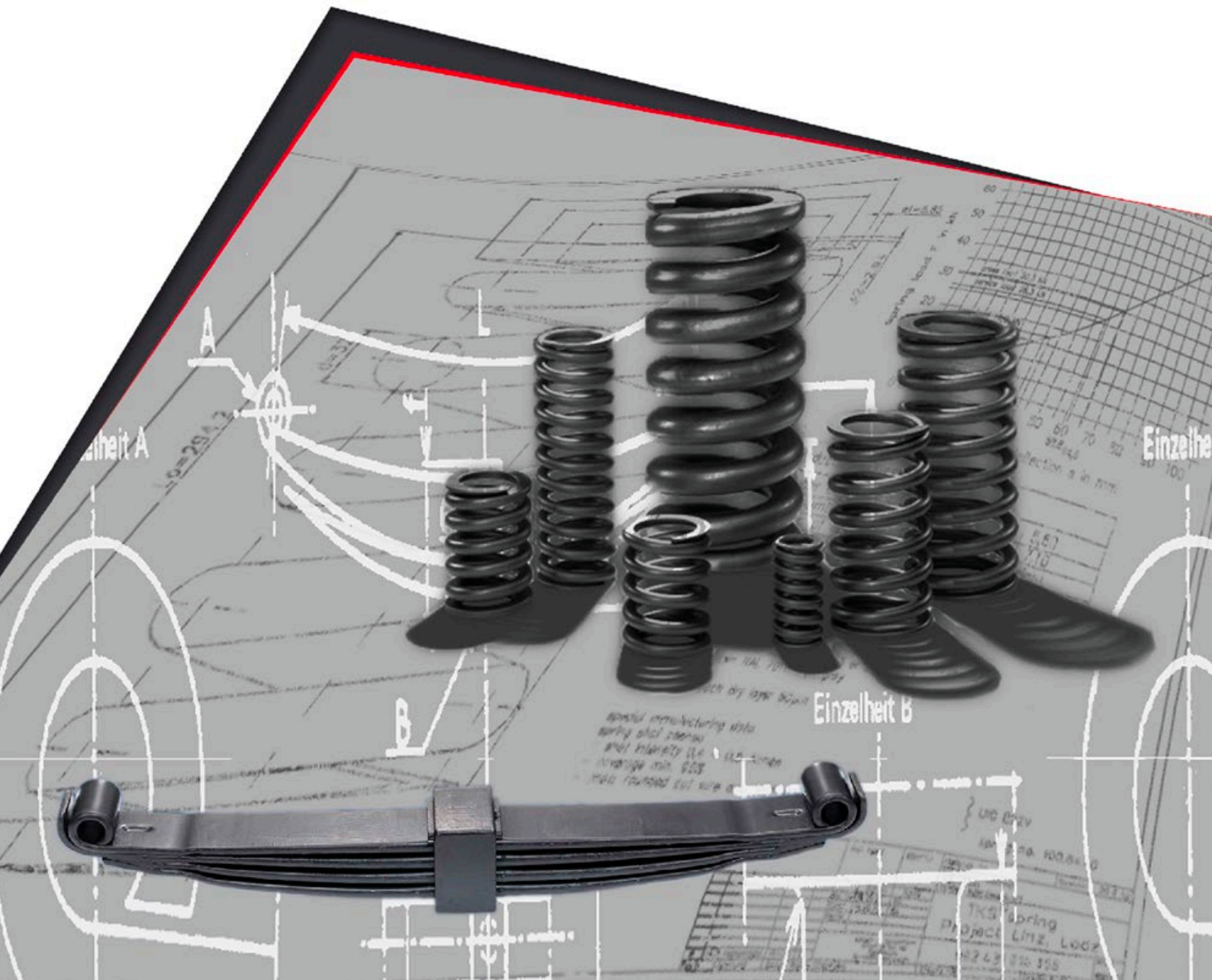


AXTONE

RAILWAY COMPONENTS





AXTONE spring technology. Two prestigious spring brands L&S and HSW

With the acquisition of the companies Langen & Sondermann in 2012 and HSW – Zakład Sprężynownia Sp. z o.o. in 2014 – both leading manufacturers of springs for all kinds of rail vehicles – AXTONE has added a new dimension to the group. Combining the products and knowledge of both companies, we are convinced that we have become an even more complete partner for our customers.

Continuous development, quality awareness and total customer orientation are the most important ingredients of our company's philosophy. We aim to continue to be the market leaders also tomorrow!

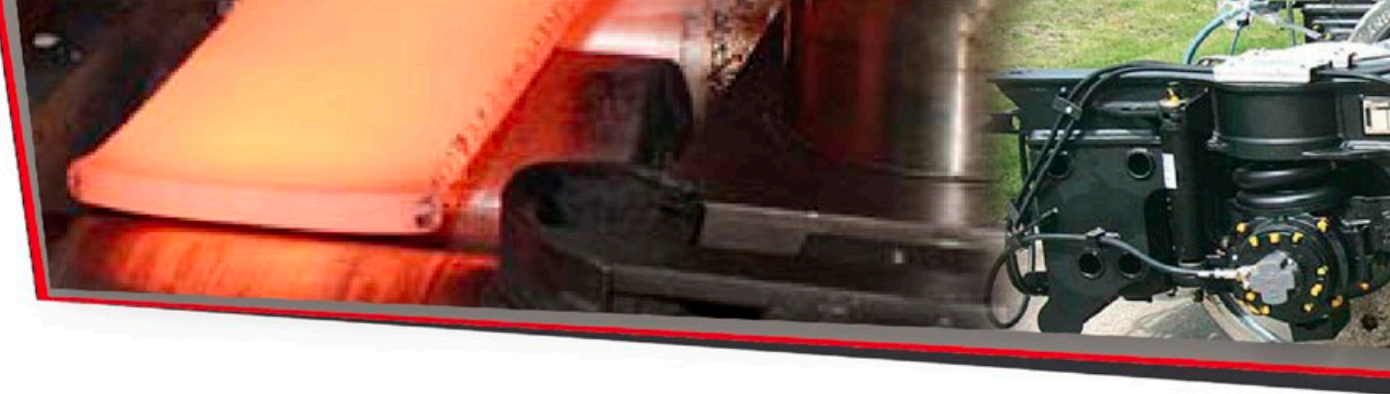
At the start there are often just a simple drawing or a few requirement specification figures. However, that's all we need.

Our own development department adapts with great precision the construction of the springs exactly to the customer's requirements. The starting point of our design work could be an extensive set of specifications or just a rough sketch of the requirement.

Once we know the intended purpose, the load factors the springs have to cope with, and the space we have available, our development department will soon present some convincing designs and calculations to you.

We know exactly which kind of spring of which dimensions and of what property will be the right one for your purpose.





Coil springs: Flexible deployment

AXTONE Group manufactures coil springs using rods from 2 mm up to 80 mm diameter, up to 12,000 mm length and the springs have a maximum overall diameter of up to 450 mm.

Whether twisting left or right, rolled out or ground directly from the rod, with linear or progressive characteristic – nothing is impossible.

A vast multitude of thousands of different types meets the requirements of a wide range of applications, with new additions every day. Be it locomotives, freight wagons (e.g. Y25 bogie and others), passenger coaches, railcars, trams or high-speed trains such as ICE and TGV – AXTONE provides the right springs for all kinds of rail vehicles. Additionally, we offer spring solutions for mining industry, construction machinery, playground equipment, power plants, agricultural machinery and systems used for vibration isolation.

Key features of our products:

- AXTONE coil springs are made of high-strength spring steels from selected suppliers.
- AXTONE coil springs are produced with state-of-the-art equipment and processes.
- AXTONE coil springs stand for high quality, long lifetime and high reliability.

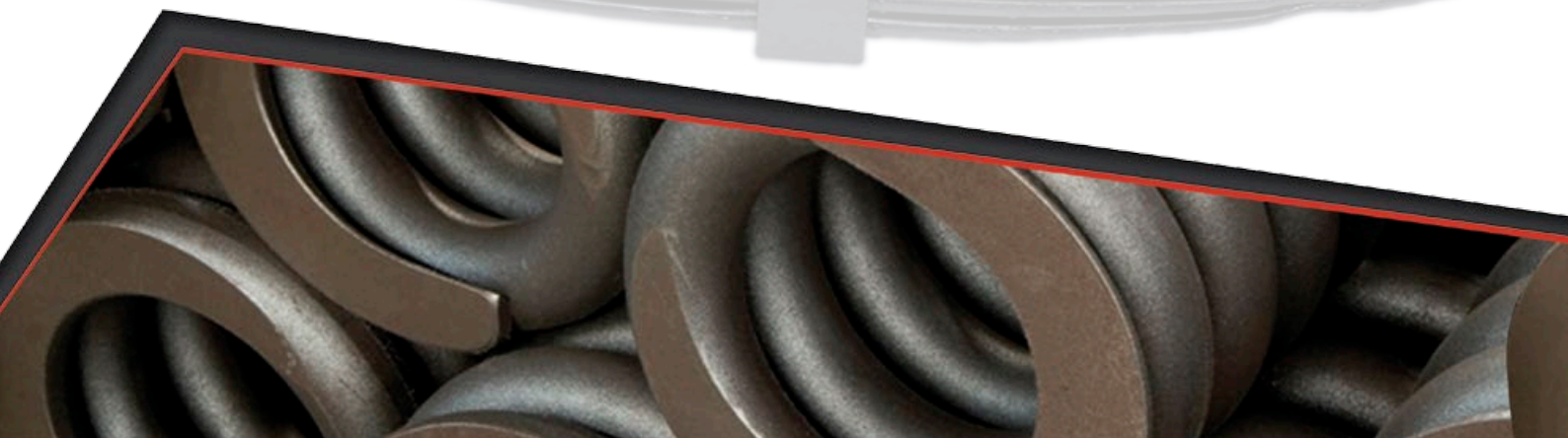
Parabolic springs and trapezoidal springs: Flexible and adaptable

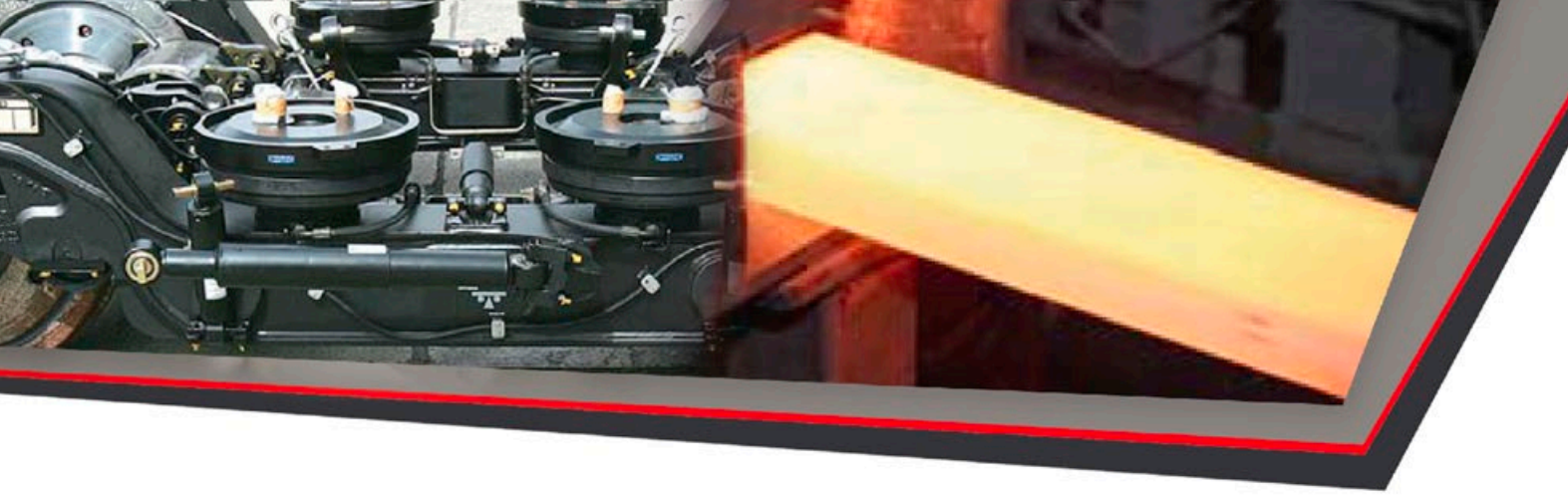
Trapezoidal springs and the modern parabolic springs, made by AXTONE, are well proven spring elements for freight wagons all over Europe and beyond – in many dimensions and special designs!

If you should ever get the impression that there is nothing in our extensive range that meets your special needs, we will react – as flexible as our springs – with a customized solution, made to measure for your vehicle.

Key features of our products:

- AXTONE leaf springs are only made of high-strength oil-hardened spring steels.
- AXTONE leaf springs stand for high quality, long lifetime and high reliability.
- AXTONE leaf springs can be adjusted to customer's demand due to our development capabilities and experience.





TKS® springs: Progressive coil spring for railway vehicles

Higher requirements regarding speed and wheel set loads of railway vehicles lead to the need of suspension springs with progressive spring characteristic.

In most cases spring sets are used consisting of two linear coil springs which are different in length, the inner spring usually being shorter and therefore starting to act later when a certain spring load is reached. The disadvantage of this solution lies in the fact that the inner spring is not loaded up to the contact point and can thus oscillate freely in the outer spring, damages to the paint and an unpleasant rise of the noise level being the consequence.

An alternative solution is the conventional coil spring with constant wire diameter, which achieves its progressive characteristic by means of variable distances between the coils. Due to the constant wire diameter, the spring length increases, what often makes the use in railway vehicles more difficult or even impossible.

The **AXTONE TKS® spring** with taper rolled wire cross section in the progressively acting coils offers the optimum solution! The wire of the progressive coil zones is taper rolled in such a way that the width of the resulting cross section corresponds to the wire diameter of the spring and the thickness is adapted to the respective stress.

Advantages are:

- Progressive spring characteristic
- Spring with cylindrical form and constant inner and outer diameter
- Shorter in length compared to conventional progressive coil springs
- Lighter in weight than comparable progressive coil springs

We would be pleased to send you detailed information on request!





Quality products can only be made with modern machines and facilities. Flexible production

To meet our own high quality stipulations we have found it necessary to design and build the most vital machines and facilities ourselves. As a result, we have the most modern and state-of-the-art machinery for production and quality control.

This enables us to manufacture superior products of the highest quality levels, which is very important, since our springs are considered safety critical items. For many years, our springs will maintain a flawless vibration control and energy storage component, even under very tough conditions.

The right quality of the materials, construction and dimensions are just as vital for a long-lasting and flawless functioning as the precision of our production. The use of CNC-based production machines guarantees a high repetitive precision and flexibility, which affords an economical production, even with small batches. Ongoing production control right up to the ultimate check on completion by special test machines is a standard procedure for us.

To guarantee the constant high quality and reliability, endurance tests are regularly repeated on our own hydro-pulse testing machines. It goes without saying that this is especially important for any new product development!

But the best machines are only as good as the operators who work on them. Our team of highly skilled and experienced specialists guarantees production of absolute quality and reliability.

The quality of our products and organization is confirmed by numerous certificates, such as:

IRIS Certificate rev. 02
ISO 9001:2008 Certificate
AQAP 21 10:2009
AAR M-1003
DB HPQ for coil springs
DB HPQ for leaf springs
DB Q1 Certificate
České dráhy, a.s.
Cargo Slovakia, a.s.
PKP CARGO S.A.
PKP INTERCITY S.A.
etc.



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RAILWAY COMPONENTS

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